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THE UNIVERSITY OF CHICAGO PRESS
CHICAGO, ILLINOIS, U.S.A.

December 1944 Volume LII, No. 6

THE JOURNAL OF POLITICAL ECONOMY

EDITED BY JACOB VINER AND F. H. KNIGHT, WITH THE CO-OPERATION OF THE OTHER MEMBERS OF THE DEPARTMENT OF ECONOMICS OF THE UNIVERSITY OF CHICAGO

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The Journal of Political Economy is published quarterly, by the University of Chicago at the University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois. The subscription price is $3.50 per year; the price of single copies is $1.00. Orders for service of less than a full year will be charged at the single-copy rate. ¶ Postage is prepaid by the publishers on all orders from the United States and its possessions, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Haiti, Republic of Honduras, Mexico, Morocco (Spanish Zone), Nicaragua, Panama, Paraguay, Peru, Rio de Oro, El Salvador, Spain (including Balearic Islands, Canary Islands, and the Spanish Offices in Northern Africa; Andorra), Spanish Guinea, Uruguay, and Venezuela. ¶ Postage is charged extra as follows: for Canada and Newfoundland, 16 cents on annual subscriptions (total $3.66); on single copies 4 cents (total $1.04); for all other countries in the Postal Union, 40 cents on annual subscriptions (total $3.90); on single copies 10 cents (total $1.10). ¶ Patrons are requested to make all remittances payable to the University of Chicago Press in United States currency or its equivalent by postal or express money orders or bank drafts.

The following are authorized agents:
For the British Empire, except North America, India, and Australasia: The Cambridge University Press, Bentley House, 200 Euston Road, London, N.W. 1, England. Prices of yearly subscriptions and of single copies may be had on application.

Claims for missing numbers should be made within the month following the regular month of publication. The publishers expect to supply missing numbers free only when losses have been sustained in transit and when the reserve stock will permit.

Business correspondence should be addressed to The University of Chicago Press, Chicago 37, Ill.

Communications for the editors and manuscripts should be addressed to the Editors of The Journal of Political Economy, The University of Chicago, Chicago 37, Ill.

The articles in this journal are indexed in the *Readers' Guide to Periodical Literature*, New York, New York.

Applications for permission to quote from this journal should be addressed to The University of Chicago Press, and will be freely granted.

Entered as second-class matter April 4, 1944, at the post-office at Chicago, Illinois, under the Act of March 3, 1879.
Acceptance for mailing at special rate of postage provided for in United States Postal Act of October 3, 1917, Section 1103, amended February 28, 1925, authorized July 13, 1918.

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THE JOURNAL OF
POLITICAL ECONOMY

Volume LII DECEMBER 1944 Number 4

REALISM AND RELEVANCE IN THE THEORY OF DEMAND

FRANK H. KNIGHT

THE treatment of demand is the branch of economic theory in which methodological problems are most important and most difficult. This is because it is here that behavior facts are most inseparably bound up with motivation and that objective data call most imperatively for interpretation by subjective facts and meanings.[1] The objective in this paper is largely negative—to criticize certain recent innovations in the treatment of demand which have been generally hailed as representing an advance but which, in the writer's opinion, constitute a movement in a backward direction. The particular reference is to the treatment of demand and utility by J. R. Hicks, pioneered by E. Slutzky, and also followed, and more or less independently worked out, by Henry Schultz and many others.[2] The essential features of the theory are a new psychology of consumption and a distinctive treatment of the demand curve based upon the former. The new interpretation of consumption is more relativistic than the conventional view, specifically that of Marshall, and is adopted for the sake of greater objectivity. It has two aspects. The first is replacement of the conception of "absolute" diminishing incremental utility (of a single good) with a diminishing "coefficient of substitution" of one good for another, assumed to be a purely behavioristic principle, or at least purely relative. The second aspect is a distinctive view of the relation between change in income and change in the psychic state of the subject—his economic well-being. In this second connection the thinkers criticized have not been willing to follow through with a behavioristic complete rejection of subjective

[1] In the pure theory, or ultimate analysis, of economic behavior, production is for consumption and does not involve any motivation other than that which is derived or imputed from the consumer interest. Production and consumption should be defined in such a way as to make this distinction clear. Immediate preferences between productive activities will then be treated as situations in which a certain amount of consumption is simultaneous with production, and the two are inseparable. And saving—net production of capital—will be viewed in the usual (only partly realistic) way as provision for future consumption. The sweeping limitation of such assumptions, in contrast with the inclusive facts of motivation, can be given only incidental notice in this paper.

[2] Hicks, *Value and Capital* (Oxford, 1939), chap. i; Schultz, *The Theory and Measurement of Demand* (Chicago, 1938); see also the contributions of Mosak and Samuelson to *Studies in Mathematical Economics and Econometrics, in Memory of Henry Schultz*, edited by O. Lange, F. McIntyre, and T. O. Yntema (Chicago, 1942).

magnitudes—or their reduction to the role of a "force" impelling men to buy and consume and to compare and choose. They still think of the individual as controlling his consumption with a view to securing more rather than less of something called "utility"—a subjective magnitude which is maximized when the consumer's behavior conforms to the economic ideal. They merely insist that this something-maximized need not, and therefore should not, be treated as a quantity in the ordinary "cardinal" meaning, but as only "ordinal," that is, utilities are subject to ranking but not to real quantification, which is identified with measurement.[3]

In the way of construction we shall attempt to clarify the relationship between the subjective and the objective aspects of the economic values of different consumption goods—more accurately, services—under given conditions correctly defined and the relation between levels of objective consumption, or real income, and economic well-being. On the basis of this analysis we shall outline a realistic theory of the demand curve. Part IV of the paper will take up the problem of measurement in connection with economic well-being and motivation; Part V will offer a brief re-examination of the problem of consumer's surplus. In the first three parts, it will be assumed that the reader has a general knowledge of recent controversial discussion, and our treatment will be confined to a brief statement of essentials, without elaboration in detail.

I. THE THEORY OF INDIFFERENCE—VARIOUS METHODS OF EXPOSITION

For a clear, sound, and useful theory of demand, or the demand curve, the first essential is a sharp separation between the comparative economic values of different goods in relation to a given level of "economic well-being" of the individual consumer and a theory of the relation between changes in the level of well-being and changes in consumption. In the absence of any better terminology, we may refer to the first as the "theory of comparative value" (relative in the sense of comparing different goods) and to the second as the "theory of dynamic valua-

[3] In the course of this discussion we shall distinguish sharply between quantification and measurement, stressing quantification by estimation without measurement, and will use the terms "quantity" and "ordinal magnitude" to designate the two main concepts which are to be contrasted.

This article will not be encumbered with references to the literature—even that which is known to the writer and which, in view of his mathematical limitations, he feels competent to judge. This applies especially to recent work (including articles by Hicks) based on the assumption of absolute money prices and relative utility, which it is the main purpose of the article to criticize. Earlier references may be found in the books of Schultz and Hicks cited above in n. 2. The aim here is to clarify issues and state a position in nonmathematical and the simplest possible terms. To venture into detailed criticism of the history of doctrine would both extend the paper far beyond allowable compass and make its perusal laborious and confusing. The writer may note, however, that he was first jolted out of complacency and led to rethink the problem by reading a short article by Oscar Lange, "The Determinateness of the Utility Function," *Review of Economic Studies*, I (1934), 218–25. Also that in the discussion which followed the publication of this article and of articles by Schultz and Hicks and Allen in 1934 and 1935, and their independent rediscovery of Slutzky's paper of 1915, Harro Bernardelli stands out as a thinker, and particularly one of mathematical competence, who has "kept his feet on the ground" and not been swept away by the romantic glamour of revolution and the temptation to indulge in logical ingenuity presented by the "new" form of analysis. Cf. "Notes on the Determinateness of the Utility Function," *Review of Economic Studies*, II (1934–35), 69–77. It goes without saying that we recognize the high intellectual quality of the work which has gone into the development of the "new approach" and its value in contributing to the clarification of the issues, and also that choice between fundamental assumptions is, to some extent, a matter of taste and may depend on the purpose in view in a particular exposition.

tion." It is to be understood that the term "value" is used in the strictly economic sense, without any implication of "objectivity," as in ethics or aesthetics, where valuations may be "right" or "wrong" or be affected with a quality of imperative or "oughtness." As in all economic discussion, we take the consumer's individual evaluations as final. We also exclude the factor of "error" in its more intellectual meanings; we assume that what the consumer wants is what he gets, and describe his behavior under the condition that he "correctly" solves his "economic" problem, actually maximizing whatever it is that he tries to maximize in the choices which direct his behavior as a consumer.

We first consider different methods of graphing in the simple case of a two-commodity system. In order to make the most useful approximation to the conditions of real life, we assume that an individual A is given a total income (over a short interval of time dt) in the form of a definite amount y, of commodity Y, measured along a vertical axis and that he is confronted with the opportunity of exchanging successive increments of Y for increments of another commodity, X, measured along a horizontal axis (see Fig. 1). The conditions are such that A "buys" successive infinitesimal increments of X, seriatim, paying for the first the maximum amount of Y which he is willing to pay, for the second the maximum amount he is willing to pay after having bought the first, and so on. Thus we picture the "generation" of a curve IC_1, the simplest form of indifference curve; for the purpose of distinction we shall call it the "indifference-combinations" curve. The ordinate on this curve at any point on the X-axis measures the amount of Y which A will have left out of his original supply (per unit of time) after carrying the process to any point, while the abscissa of the same point measures the amount of X he will have secured. (The total amount of Y given up is measured downward from y.) Every point on the curve represents a different combination of amounts of X and Y such that to the given subject A (with initial income y) exchange or choice between any two combinations is a matter of indifference. The ratio or price at which the last exchange is made (or the next one will be made) is measured by the slope of the curve at any

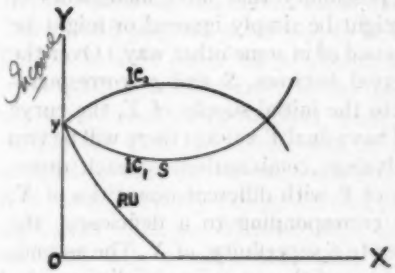

FIG. 1

point—with a negative sign, if, as is usual, we think of the price of X in terms of Y, the price of the good secured in terms of that given up.

If we continue such a curve to the right over a sufficient interval, it will take the general form shown in Figure 1. The facts here are not in dispute, especially as far as the descending section of the curve is concerned. The curve will descend over some interval, with a decreasing (negative) slope, to a point at which it becomes horizontal; and then, if the experiment is continued, it will ascend at an increasing (positive) slope. The lowest point S on the curve (the point at which it is horizontal) corresponds to complete satiety with good X; the price of X here is zero, and no further amount of Y will be voluntarily

given up for any further amount of X. Under the conditions of a two-commodity system, this point should ordinarily have the same X value, regardless of the subject's initial income, if X and Y are "independent," i.e., noncomplementary but different goods.

Along the ascending leg of the curve the increasing slope shows that it would be necessary to give back to A increasing amounts of Y, previously given up, to "hire" him to consume each successive increment of X. (We assume consumption, compulsory if necessary, ignoring the possibility that later increments of X might be simply ignored or might be disposed of in some other way.) Over the interval between S and y corresponding to the initial supply of Y, the curve will have dual Y values; there will be two equivalent combinations of each quantity of Y with different quantities of X, one corresponding to a deficiency, the other to a superfluity, of X. The ascending part of the curve is unrealistic under ordinary conditions where the subject has freedom of choice; but the hypothetical procedure is useful for depicting the psychology of demand. The curve IC_1 may be extended upward beyond y, giving A more Y than his initial income, to a point at which it would become vertical, indicating that no more of X could be consumed without making him absolutely worse off (or more than would be voluntarily consumed) no matter how much Y were given him at the same time. The facts shown by the indifference curve may also be presented by a curve drawn upward initially and then downward (curve IC_2 in Fig. 1). This has some advantages, particularly that the amounts of Y given up are indicated in positive instead of negative terms in the significant part. But points on the curves will not then represent "indifference combinations" of X and Y, on the same axes.

Exactly the same facts may again be portrayed by a curve of relative incremental (marginal) utility, as shown in curve RU, which may be called a "curve of indifference-prices" or a "price-indifference curve." On this second curve the vertical axis is a scale of exchange ratios or prices (Y/X or Y per unit of X, at the margin, i.e., dY/dX, in the previous notation); that is, the price at any point is measured by the ordinate instead of by the slope. Hence the ordinate of RU measures the slope of curves IC_1 and IC_2 at any point on X, or it is the "derivative" of either of these except for algebraic sign in case of the former. Curves IC_1 and IC_2 may be viewed as curves of total expenditure drawn under the condition that a consumer buys from a monopolist who exacts the maximum total amount (or maximum price per unit) the buyer is willing to pay for each amount of X. The radical difference between RU, the derivative curve, and a demand curve, showing amounts purchased at given prices with the buyer free to choose the amount he will take at each price, will come into consideration repeatedly as the argument proceeds. Curve RU will intersect the X-axis at the point at which the indifference curve as previously drawn (in either form) becomes horizontal, and beyond that point the indifference-price will become increasingly negative.

The hypothesis of a two-commodity system is, of course, unrealistic and should be used with great caution. Details of the curves would depend on necessarily arbitrary assumptions as to the character of the two goods and the relations between them. To make the discussion more realistic, we should first take the vertical axis as a scale in terms

of "money" representing a complex of alternative commodities, at prices which vary together, but inversely with the price of X, so that the money has constant total purchasing-power. This change in the facts represented will not change the general form of any of our curves. This is still true if any of the commodities in the complex Y are interrelated among themselves or with X by any degree of complementarity or similarity. And it is immaterial for the general argument just what price changes occur within the alternative complex, among the infinitude of possibilities, to offset the changing price of X and keep the value of money constant. The indifference-combinations-curve method of graphing (for X and money) has a great advantage over the indifference-price method, in that the former shows money income directly on a plane diagram and so makes it possible to represent a whole "system" of curves, corresponding to different levels of income. But its use is limited because it does not correspond with market quotations and everyday ways of thinking, which necessarily run in terms of price and quantity.[4]

II. CONSUMER'S VALUATION AS A "DYNAMIC" PROBLEM

We turn to the psychological problem of the interpretive explanation of the curves considered in Part I or of the facts which they represent. The curves are taken as portraying objective facts of consumer behavior (though under idealized conditions), with only incidental reference to any subjective state as "indifference." But it is necessary to decide whether they are to be allowed to stand as purely empirical or are to bring the behavior facts into some intelligible relation to facts of subjective experience.[5] The second position is the one to be defended in this paper as a whole. The more philosophical aspect of the argument for considering motives, and not merely the facts of choice, will be developed in Part IV. In the present section we shall merely explore certain psychological relations. Further than this, we need only remark here that such terms as "willingly" and "voluntarily" occur in the earlier exposition and suggest that it would not be easy to eliminate them and make the discussion seem to "talk sense."

The main concrete issue directly raised is whether we should think of the "utility" of a single good—the property which causes it to be consumed and

[4] We more commonly meet with the indifference-combinations curve for two goods as generated by changes in opposite directions from an intermediate starting-point, as roughly suggested in the accompanying figure. Only a part of the negatively inclined portion of the curve is usually drawn, the continuous line in the figure. If the curve is projected in

realistic form in both directions, it will have the general shape indicated by the dotted portions. Details would largely depend on the goods in question, their absolute and relative importance, relations of complementarity and substitution, etc. Single commodities that are actually "necessary" hardly occur, and this and other special cases need not be considered. In both directions the curve will ordinarily become parallel, first, with the neighboring axis and then with the other axis. This second event might occur before reaching a point of intersection with the other branch, preventing completion of the closed figure shown. In any event the situation represented by the parts of the curve beyond zero marginal utility for either commodity is unrealistic and need not be discussed.

[5] The former procedure was followed by Cournot in a pure-theory treatment and is the point of view of statistical investigators of demand.

chosen for consumption in preference to other goods—as an independent variable, or as inherently and solely a comparison between the particular good and other goods. In other words, should we view the essence of (final) economic value as purely a comparison or think of relative value as a comparison between the values of different goods? Investigation of the question will take the form of an inquiry into the dynamic problem of the quantitative relation between uncompensated variation in the consumption of individual goods or combinations of goods and variations in desirable experience or state of being in the consumer, i.e., in his "mind." In terms of the established principles used in the analysis of demand, prior to this new controversy, the issue will be found to center in the principle of diminishing utility in connection with an individual good. As pointed out earlier, the Slutzky school deny this principle; they replace it by a combination of two devices, the principle of a decreasing ratio of substitution of one good for another—at a constant level of well-being expressed through "free" choice—and a ranking without "measurement" (or quantification) of states of total well-being, as an individual passes from one indifference level to another.

Our first step will be to inquire into the reality of the principle of diminishing utility for a single good. The investigation may take the form of reflecting upon a series of simple imaginary experiments. To make the analysis accurate and the conditions realistic, in contrast with the vague and misleading assumptions usually met with, we must begin by carefully stating the *ceteris paribus* conditions. We postulate an individual who is consuming a "reasonable" list or budget of commodities, not including the one involved in the experiments, and who continues throughout to consume these in unvarying amount. The first experiment consists in adding to the individual's consumption of these items successive equal small (infinitesimal) increments (per unit of time) of the particular commodity or good X, not before consumed, and having him report upon his experience of "satisfaction." These conditions allow full play for all relations of complementarity and similarity ("substitutability") among all the commodities, including the one which is varied in the experiment.

In the interest of precision and clarity, other conditions of the experiment need to be carefully stated and some terms defined. We must sharply separate consumer behavior from all productive activity, and especially from saving and investment, and must be clear about the dimensionality of the magnitudes with which we are dealing. To touch first on the second point, consumption (like production and all "activity") has the dimensionality of a flow or "flux." But the correct physical analogy is not the flow of a material such as water, which exists and can be measured when it is not flowing. Light is perhaps the best physical analogue in this respect. The rate of flow of water is realistically viewed as a composite magnitude—quantity divided by time. With light the relation is the opposite. Only the intensity can be measured directly (though the unit may be defined in terms of other dimensions); quantity is the composite and derivative magnitude, an arithmetical product of intensity *times* time—candle-power-hours. It is a mere concept, essentially fictitious.

The same relation holds for consumption, whether thought of as a subjective or as an objective magnitude. What is consumed is always a *service* (of some

agent, human or "physical"). The result, which is the end or purpose and which gives consumption quantitative meaning, may be called "want-satisfaction," or simply "satisfaction"; but "subjective service" is a less objectionable designation. Any more concrete definition will commit the economist on psychological or moral issues with which he has nothing to do. It is simply the common quality underlying all direct economic comparison and choice—"that which" the consumer strives to maximize and does maximize when his behavior is "economic." It must be a homogeneous magnitude if we are to speak of quantitative change; and, since there is no physical attribute which is common to all sources of satisfaction, the end of consumption must be a single variable state or condition of the individual. We assume that what is desired is identical with what is realized and experienced; that is, we abstract from error —connected with the fact that consumption may be treated as a means to welfare as the real end—and from the fact that novelty, surprise, and gratification of curiosity are elements in real enjoyment and in the motivation of choice. This assumption is largely implied by ideal stationary conditions, in which desire and satisfaction, production and consumption, are strictly simultaneous. ("Utility" is the attribute of an agent by virtue of which it yields subjective service, and the two terms are not always interchangeable.) Correspondingly, the primary meaning of production is "objective service" or the use of any agent to render subjective service.

The main source of confusion in relation to consumption is the fact that production in this primary meaning is not necessarily equal to consumption over any interval of time. Production may exceed consumption, the difference being (axiomatically) added to "capital"; i.e., it may consist in the production of (additional) capital and not of "satisfaction." And, conversely, consumption may exceed production, the difference representing a decrease of capital. (Production of what is consumed includes maintenance of capital.) Since the production of any amount of capital (saving and investment) represents the sacrifice of a given amount of consumption and results in future consumption, it seems natural to think of a quantity of capital as a quantity of consumption stored up in a stock. But this is invalid, for two reasons. The quantity of capital accumulated in any finite interval is not the amount of consumption sacrificed—intensity *times* time—but contains an additional element, a return on investment, continuously compounded at a certain "rate." (This is usually referred to as the rate of interest, but it has no connection with the lending of money—or of anything else—and would have exactly the same meaning in a Crusoe economy as in a pecuniary society.) On the other hand, a quantity of capital does not represent any determinate quantity of future consumption. Until and unless the capital itself is consumed, the total yield grows without limit; and in any case it also is affected by the rate of return or interest. Analysis requires treatment of the production of capital during any interval and its subsequent use to yield consumption-service (or further investment) as distinct acts or processes of production.[6]

[6] It should go without saying that the "production of capital" means here "net production" or "growth," distinguished from the maintenance of capital already existing, including all replacements, even by a different type of concrete agent (and that "capital" consumption means "net" consumption). In real life the bulk of investment is "presumptively permanent"; only the yield is expected to be con-

Elimination of all investment and disinvestment in effect reduces exchange to the purchase and sale of services, without any transfer of "goods" (all of which are "capital"), and imposes stationary conditions. It also eliminates all lending of money; for, under ideal conditions, such a loan is indistinguishable from a lease for a rental. Similarly excluded are all "contracts" for the purchase and sale of services, involving any commitment for the future. It is most convenient to think of the consumer as not owning any productive capacity, and particularly any money.[7]

Returning to our imaginary experiment, we are to think of our subject as having no alternatives of choice; he is simply given increasing amounts (per time unit) of a particular objective service, which we shall now call os_i. We submit that beyond any possibility of doubt he will report decreasing increments in the intensity of subjective service ss_i from equal increments of os_i (added to his original budget). That is, the variation in his additional satisfaction will show progressive satiation up to a point of complete satiety, and then run into supersatiation with increasing increments of negative satisfaction. It will be represented by a curve of the shape of a round arch or inverted U (preferably measured upward from a false base line). It is to be stressed that the increments of subjective service are not quantified (on "measurement" see below) by comparison with any other kind of satisfaction. Each increment of satisfaction is compared only with the increments of the same kind which precede it in the sequence. The total real income of the subject increases by equal steps, as defined and measured in physical units by an ideal index number, while, in subjective terms, it behaves in the manner described. Thus the curve and its derivative are very different in meaning from IC_2 of Figure 1.

The experiment is, next, to be modified in two steps. First, we give the subject increasing amounts, in fixed proportions, of all the items in any fixed budget or list of services. The resulting variation in total satisfaction will certainly take the same form as before. Next we give him "money" in increasing amounts (increasing by equal increments), restricted to the purchase of a given list of items at fixed (absolute) money prices, with freedom to reapportion his expenditure among them at will. The reported result will again be of the same kind—total satisfaction increasing by decreasing steps and then decreasing.

If introspection leaves any room for doubt as to the declining (arithmetic) rate of increase, it is proved by the unquestionable fact that if the money income of an individual increases, under realistic conditions (i.e., if he has freedom of choice) he will not merely buy more of the services previously consumed but, in addition to buying more of these, will spend part of his increased income for services not previously consumed.

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sumed, or not all of that, apart from some emergency —but, of course, there are important exceptions. We cannot go into the special difficulties of investment in human beings or their capacities (and its maintenance) in "free" society, beyond noting that in essential respects these are much like any other capital. This fact and its practical limitation will be evident if one compares conditions in a slave economy with those of free individualism (see also n. 7 below).

[7] This assumption again raises the difficulty of the individual's ownership and use of himself as a productive agent. It is really necessary to assume only that all ownership, of things or capacities or money, is held constant. Consumption must be separated from such changes, particularly in the holding of money, in order to isolate the special problems connected with that cause. One important desideratum in economic analysis is to bring out explicitly the unrealistic assumptions necessary to generality at every point.

This is wholly inexplicable and would not happen, except for the fact that the whole list previously consumed is subject to diminishing incremental utility. Mere growth of total income cannot increase the utility of items not previously consumed and cannot increase their relative marginal utility or coefficient of substitution, in comparison with earlier items, unless increased consumption absolutely reduces the marginal utility of the earlier budget items. We cannot realistically interpret the decline in the marginal utility of one good increased in supply relative to others not consumed, hence its decreasing coefficient of substitution for the latter, without taking into account its decreasing absolute marginal utility as its consumption increases, *ceteris paribus*. Further, the negative price elasticity of demand for a good cannot be dissociated from declining positive income elasticity, all prices being constant and with the consumer free to add new items. And decreasing income elasticity can result only from decreasing marginal utility of any whole list of goods or of money to be spent for them at given prices.[8]

The propositions (*a*) that utility and satisfaction are purely relative and (*b*) that the total is merely an ordinal magnitude are impossible even under the assumption that demand curves are to be studied exclusively with reference to a given list of commodities. If absolute marginal utility did not decrease, no determinate apportionment of income would be made. If we think of the consumer's income beginning at zero and gradually increasing, the first increment would be spent on the service yielding the most satisfaction for the initial unit, or one chosen at random. And if increasing consumption of this item carried increasing or constant incremental satisfaction, no other items would ever be added but all further additions to income would be spent for the same good. (With incremental change constant, adding new items would either involve loss or be a matter of indifference.) It is logically admissible to think that the marginal utility of a particular good may increase with increasing consumption over a narrow initial interval; and this might even be true of total income, under special conditions. But the rational consumer will never stop using

[8] There is actually no reasonable ground for doubt that money income of constant objective purchasing-power decreases in marginal utility (and utility per unit) as its amount increases, even if expenditure is not restricted to the purchase of the same goods. This restriction only makes the conclusion more obvious and the decline more rapid than if the individual is free to add new items to his budget. The rate of decline might be reduced by a high degree of complementarity between items previously consumed and new items; but the general effect of this will be merely a greater variety in consumption at all income levels. It is a judgment of common sense, on a level of self-evidence virtually that of the simpler mathematical axioms that, other things being equal, the addition or subtraction of a dollar per week or month from his income means less to the recipient of a larger income than to one whose income is smaller. Apart from this principle, no one would defend or suggest the justice of progressive income taxation. Equality of sacrifice of "final value" to the subject (however this is interpreted) would then call for absolutely equal taxation, not even equality in the fractional levy, to say nothing of progression. (The statement assumes that consumption is the only significance of income, ignoring such factors as security, prestige, power, justice, etc., which may make equality a consideration for other reasons or on its own account.)

As far as the present discussion is concerned, we need not dispute the usual assumption that the desire for income is insatiable, that its marginal utility would never fall to zero or become negative, if it can be used to satisfy additional wants. However, the proposition is doubtful if wants are strictly defined in terms of consumption, excluding social emulation, prestige, and power. And it is surely false if we go on and exclude special costs of change desired purely for the sake of change. However, this factor bulks large in want-satisfaction even at low income levels and introduces an element of unreality into a mechanical or function-and-variable theory of demand.

freely apportionable income to purchase any quantity of a good within an interval of increasing marginal utility but will proceed at least to the point of maximum utility per unit of expenditure; and (with proportions freely variable) no budget items will be added in the interval of increasing utility of money income. The situation is parallel with that of productive services, where the operations are limited to the range of diminishing physical returns. All facts of complementarity and similarity are essentially the same in the two cases. Subjective service is not physically measurable, but its quantitative variation is factually indubitable; and even if it were possible to explain the facts of demand without it, the procedure would be interesting only as an intellectual "stunt."

We must hasten to take account of a realistic difficulty in reasoning from the addition of new items to a budget, with increasing income in money of constant purchasing-power. In this situation an individual will not usually increase his consumption of all previous items but, besides adding new items, will to some extent *replace* commodities previously consumed with new ones, decreasing his purchase of some of the former, or even dropping them altogether. In a familiar illustration, if he has been eating chiefly bread, at a higher income he may not only add some meat but consume less bread. Moreover, he may also replace a lower "grade" of bread with a higher grade. As we classify commodities more "finely," even to correspond with market facts in a high civilization, displacement of items may predominate over increased consumption.

The phenomenon of replacement of "inferior" by "superior" goods or the reverse, as income changes, has received much attention in recent discussion. The correct view is that they are different goods. Even the "same" good bought from a dealer of a different class is really a different thing—certainly, if a different price is paid, whatever the reason. The underlying fact is that any commodity, as named and sold in the market, yields a "bundle" of diverse subjective services, which are to be had only (or more economically) in combination rather than separately. Things regarded as differing only in grade are usually named with reference to some predominant useful quality which they have in common, along with different assortments of other qualities. At the most general level of analysis it should be assumed that each single good (objective service) as purchased yields a single type of satisfaction. This might still be allowed to vary in degree in accord with the price for the ordinary market unit, "quality" differing in that sense. Under this assumption, displacement obviously will not occur in consequence of income change.

III. THE MEANING OF A DEMAND CURVE

We must now briefly consider the demand curve in terms of its expository meaning rather than its psychological or philosophical interpretation. Here we are concerned with an aspect of the Slutzky view which has little logical connection with the methodological conceptions with which we find it associated. The demand curve in the tradition of modern economic theory shows the functional relation between price and quantity taken (or sold) for a particular good, "all other things being equal." It is always assumed that the buyer confronts a set price at which he is free to purchase as much or as little of the good as he may choose—a fact which differentiates the curve sharp-

ly from any of those we have previously considered. Until quite recently few, if any, writers were at all careful to say what they meant by this *ceteris paribus* condition; and in general it probably did not occur to them that price is ambiguous or that it is not possible for all other things to be equal. The money price and sale of a particular good cannot change while all other variables in an economic system are constant. We have to choose in analysis between holding the prices of all other goods constant and maintaining constant the "real income" of the hypothetical consumer. For, obviously, if the price of a single good, X, increases, while the prices of other goods are unchanged (along with the money income of the individual), the "value of money" to the subject will have decreased—in objective and in subjective terms—and vice versa. The strict *ceteris paribus* assumption can be valid only when there is no finite change, i.e., for the partial derivative of a total-consumption function at a single point.

The treatment of the Slutzky school adopts the assumption that the price of X varies under the condition that the prices of all other goods (and the consumer's money income) are constant. Hence, real income must change. Of the two alternatives, this seems to be definitely the wrong choice. It throws together two distinct effects upon consumption, the "price effect" and the "income effect." The treatment then proceeds to separate these by means of an ingenious analysis. The cleverness of it all must be conceded. But it is called for only because of an initial confusion in the statement of the problem, which is wholly unnecessary and should clearly be avoided. The simple and obvious alternative is to draw the demand curve in terms of a change in *relative* prices, i.e., to assume that the value of money is held constant, through compensating changes in the prices of other goods, and not that these other prices are held constant. The "income effect" of Slutzky *et al.* is merely a particular case or mode of change in the purchasing-power of money, or the price level; and it is this problem as a whole that should be isolated and reserved for separate treatment.[9]

As to reality, important price changes generally approximate one or the other of two patterns. Either the price of a particular good changes, relative to the prices of other goods—reflecting some change in tastes or productive conditions—without a significant change in the general price level, or all prices change more or less simultaneously, in consequence of monetary changes. In so far as change is general and uniform, the whole phenomenon is purely arithmetical, particularly since incomes change in the same ratio as the prices of consumption goods. Of course, the two types of change occur together, to some extent; and especially the relative prices of consumption goods and of various indirect goods and productive services (and the present values of contracts and other commitments) are differentially changed over substantial periods by changes which originate in the field of money and ultimately lead chiefly to a movement of the general price level. Boom and depression are incidents of such temporary changes. Real, practical price problems arise only in connection with changes in relative prices, and it is exclusively the connection of general changes with such relative changes that gives the general price

[9] The conception of price changes as relative is, of course, the view which was made classical by the treatment of J. S. Mill and is perhaps the position generally adopted in textbooks—when the authors state their assumptions or make it possible to discern any consistent position.

level any practical importance. Consequently, the separation of price changes due to monetary causes from those due to other causes is one of the main tasks of price analysis as a whole. An approach to any particular price problem which "jumbles" effects of change in the purchasing-power of money (however caused) with effects of change in its relative value for purchasing different things is mere gratuitous confusion. And it is easy to avoid, specifically in the theory of demand. In fact, this confusing procedure is much more complex and difficult than one based on formulating the problem in more realistic terms to begin with, in the manner already indicated. That is: in drawing the demand curve, the utility and the objective purchasing-power of money are the factors which should be held constant ("impounded in *ceteris paribus*," in Marshall's familiar phrase) and not the prices of other consumption goods. This procedure has the further great advantage of eliminating the spurious "Giffen paradox" (see below) and making the theory of consumption logically parallel with the theory of production, which is in accord with the essential facts.[10]

It is a fairly simple matter to explain the general shape—the descending slope—of the demand curve (of an individual for a particular good) in terms of its (independent) diminishing incremental utility in comparison with that of other goods. Quantity purchased decreases as the relative price increases (*ceteris paribus*) because at the higher price the same amount of money buys less of the particular good, while there is a small converse effect on the complex of other goods, which fall in price. Consequently, if the consumer's marginal "dollar" bought equal increments of total satisfaction in terms of all services before the change, it will, after the change, buy less satisfaction if spent for the particular service, os_i, than if spent for competing services; and enough of os_i will be replaced in the individual's budget by other goods to restore the equality. The total expenditure upon os_i may increase or decrease or remain constant, according as the elasticity of demand (determined by all the factors which enter into the demand

[10] We may digress to point out that the general point of view and habit of mind reflected in the Hicks-Slutzky analysis has wide ramifications in recent literature and has led to utter confusion in the whole body of economic thought. We refer, of course, to the huge corpus of discussion beginning with Keynes's *General Theory* and following the lead of that work. J. R. Hicks's book, *Value and Capital*, is especially interesting as a general treatise which combines the theory of Keynes's treatment of unemployment and money with the Slutzky analysis of demand and theory of utility. It should be kept in mind that there is no logical connection between the confusion of price changes due to monetary causes and those due to other causes with either the use of indifference curves or their distinctive psychological-philosophical interpretation.

This whole episode may be viewed as a reaction against the neglect of monetary changes and their extremely important effects (boom and depression) in the main line of treatises of classical economic theory, including Marshall. Mill and other classical writers paid some incidental attention to monetary or trade crises but strangely neglected the more important and longer-range repercussions upon production, as well as the converse causal relation between productive maladjustments—especially in the field of investment—and price disorganization. Failure to deal somewhere with these phenomena is doubtless a valid criticism of the classical economic theory as a whole. But it does not follow at all that the omission is to be corrected by jumbling other maladjustments, real and pecuniary, in with the general theory of economic equilibrium. The valid remedy for the defect represents much less of a departure from tradition. It consists simply in adding what has been lacking, i.e., adding a theory of monetary perturbations to the theory of general equilibrium. We need not here enter upon this task, but we may note that, since all the important phenomena could well occur without either commercial banking or any lending of money, the perturbations of the interest rate (or rates) and their causes and effects are a relatively minor topic in the inquiry as a whole.

situation) is below, above, or equal to unity.[11]

IV. SATISFACTION AS A QUANTITY

We come to the crucial methodological, or philosophical, issue in the interpretation of economic choice, and specifically in the theory of demand. The question raised by the new school of thought has two forms or aspects. The question is whether "total satisfaction" is a cardinal magnitude, a "quantity," or is merely ordinal. This is the variable which the "economic man" strives to maximize in his choices as a consumer with a given income and as a producer with given productive resources, and strives to increase by increasing his income through saving and investment. The question is identical with that as to the reality of the diminishing marginal or incremental utility of a particular good or group of goods, as increasing amounts are consumed by an individual, *ceteris paribus*. The Slutzky analysis of demand, as developed by Hicks and others (after it was suggested by Pareto), sharply separates movement along an indifference curve (with a fixed real income) from movement from a lower to a higher indifference curve with increasing real income. We assume here that the analysis is correctly set up, with the money income of the individual increasing while all prices are constant, and that the indifference curves start from an axis of money.

The "new" analysis admits that the individual moving outward from the origin across his indifference curves is really moving "up hill" along a third perpendicular axis of total satisfaction or well-being, that the indifference curves are projections downward of contour lines on a surface. But it denies the need of assigning any vertical scale of magnitude to change in this direction. It is held that the upward movement can be represented by an index function, all other properties of which are immaterial except that it is increasing. Since that is all we need to know about it, no other information should be used in analysis.[12] This view eliminates diminishing marginal (incremental) utility of increasing total income, in whatever manner the increase is effected, in terms of actual goods. As we have pointed out, recognition of diminishing utility is another way of saying that we can draw a curve of total satisfaction in a vertical plane

[11] If we consider the whole range of price variation, the elasticity of demand will normally have a high value at the highest price at which consumption begins, and will fall to zero as price declines to some point at which consumption no longer increases appreciably with its further decline. Elasticity must, of course, be measured at a position of equilibrium. It will ordinarily be low if determined in relation to sudden changes; and the fact that these afford practically the only possibility of determining it inductively largely vitiates statistical measurements; for if a change is slow, other things cannot be assumed equal, and we cannot distinguish empirically between a movement along the curve and a movement of the curve as a whole. The elasticity of demand depends on the availability of substitutes; but freedom of substitution is only in part a matter of physical similarity between goods or even between the types of satisfaction which they yield.

It must be emphasized that the demand curve, showing the relation between price and quantity taken, under the condition that the subject is free to buy as much or as little as he pleases of o_i at a uniform price (other things being equal in other respects), is a very different thing from any form of indifference curve. A demand curve cannot be drawn from an indifference curve, nor from a system of indifference curves in the form in which these usually appear. A curve of the Hicks-Slutzky type can be drawn from an indifference map only if objective money or commodity values are given for the curves; a true demand curve could presumably (in theory) be computed from a complete "map" in n dimensions (in algebraic form) and a given income and given pattern of compensating price changes.

[12] In the absence of experimental determination of a satisfaction-function we actually work with the supposed essential properties of such functions.

through any straight line in the base plane, cutting all the indifference curves, as an X-axis and that it will ascend at a decreasing slope. This decrease in slope is a fact additional to that of ascent and can be present only if a linear scale is assigned to the perpendicular axis.

For convenience we consider movement along the axis of money, observing that the curves are spaced at equal intervals along that axis (but nowhere else) and that money has constant objective purchasing-power. For the purpose of the moment this may be given the simplest meaning—constancy of all prices. For convenience we may take this Y-axis or money axis as a new X-axis and treat the vertical third axis as a Y-axis and ask what variable it may be assumed to measure and what will be its mode of variation. There are obviously four possibilities of interpretation. The first is that the Y-axis measures merely quantity of consumption, in units of some ideal index number. The curve would be a straight line diverging from the X-axis itself only because of a different unit than money price for measuring income. Anything that may be happening to the individual internally, in his mind, is ignored if not denied. This would be the rigorously objective or behavioristic view. It is appropriate in statistical economics; but even statistics implicitly assumes comparison and direction of choice by a principle of maximizing something. Second, this view might be modified, or restated without any change in substance, by interpreting the economic tendency or urge (to consume and to proportion expenditures in one way rather than another) in terms of a "force" on the analogy of mechanics, without assuming that any conscious experience or "conation" is involved.

At the opposite extreme (third) is interpretation in terms of the theory of diminishing incremental utility, in more or less the orthodox form. This is the view advocated in this paper. It includes two statements: (*a*) that the subject becomes economically better off, in terms of conscious (or "subconscious") experience, i.e., that he enjoys an increasing "quantity" (meaning intensity) of satisfaction or subjective service; and (*b*) that he can, and will, say that the increasing conscious well-being experienced in passing from a particular indifference curve I_j to the next higher one I_k is less than the increase experienced in passing from the next lower curve I_i to curve I_j. Hence the change in his well-being can be shown by a curve of decreasing upward slope. Fourth, this third position may be modified by dropping the second statement, leaving only the first. This last is the Slutzky position, which is attacked in this paper. It admits and uses comparison between levels of satisfaction but denies or ignores all comparison of differences between different levels—all judgment by the subject as to "how much" better off he becomes through any addition to income. This view is defended by appeal to the principle that entities or fundamental concepts are not to be multiplied unnecessarily—the principle known as "Occam's Razor"; its advocates hold that the statement dropped is superfluous and, if not false, is at least irrelevant. The position has to be judged with reference to the psychological reality of decreasing increments and to its usefulness in interpreting the phenomena scientifically and for practical purposes.

The validity of the decreasing additions to satisfaction or subjective service derived from equal additions to consumption of measurable objective service, regardless of kind, has already been demonstrated in our discussion of hypo-

thetical experiments, and little remains to be said directly on that point. It is obvious to introspection that the successive equal "doses" of the service os_i or of money could be replaced with increasing doses, experimentally so adjusted that the subject would report equal, instead of decreasing, increments of satisfaction intensity. It should go without saying that we assume psychological stability in the subject and the economic or rational character of his thinking and motivation. The increments of satisfaction received from increments of a single good os_i might be experimentally quantified, and in a sense measured, by ascertaining how much of any good, or of the whole collection of goods previously consumed, represented by money, the subject would be willing to give up to secure an additional increment of the particular good at any point in the experimental variation of the latter. This could not be done for money or income as a whole, for total satisfaction can be measured only in units of itself.

There may be no harm in saying that the experiments we have described constitute "measurement," in terms of money, of the added satisfaction derived from successive increments of os_i, provided there is a clear understanding of the conditions and of the meaning of measurement in this connection. The satisfaction derived from os_i, or its "capacity" to yield satisfaction, ordinarily has no clear and direct relation to any physical attribute of the service consumed. Further, as the service enters into a budget, it cannot be said to yield a particular kind of satisfaction or a complex of particular kinds, but simply added total satisfaction. Most physical services actually yield an unanalyzable and varying complex of kinds of satisfaction, involving manifold complementary relations with other goods. We are dealing with a unique universe of subjective comparison. To investigate this new problem we must consider the relations between objective measurement, subjective experience, and estimation.

The measurement of any physical magnitude (any that is directly perceptible to the senses) is a technical procedure for improving upon the accuracy of a subjective judgment or estimate. The operation does not measure or change in any way the estimate itself as a quantitative experience; and, to whatever degree of refinement measurement is carried, there always remains an element of comparison by subjective estimation. This source of inaccuracy is much reduced, but not eliminated, by the use of the "zero method," whereby the judgment is one of equality rather than of what multiple one magnitude is of another. (The theory of demand and of all forms of indifference curves runs in terms of the zero method; at any chosen position the subject judges that a small shift in his expenditure makes no difference in his level of satisfaction.)

Physical mechanics is built around the three primary magnitudes of space, mass (or force [see below, pp. 305 ff.]), and time; and in physics as a whole the units for measuring other magnitudes are viewed as derived from these three elementary "dimensions." (Here we need think only of the classical or Newtonian conceptual system.) Of the three, space is measured in a primary and direct sense, which is not true of the other two or of any other magnitude whatever. It is only space—and, practically speaking, only length, not even area and volume—that we can cut into equal pieces, compare the pieces for equality by superposition, and count their number. The role of estimation in

this process is obvious, and the relation between measurement of distance (whether by the crude yardstick method or by one which is in any degree more refined) and its outright estimation need not be discussed. All other magnitudes, including time and mass (or force), are measured indirectly through the measurement of length, by the use of some apparatus based on a theory which brings the magnitude to be measured into correlation with a scale of length. (Usually the correlation is linear—the scale divisions on the instrument are equal—but this is a detail.)

Some aspects of the relation between subjective and objective magnitudes can be brought out by the example of thermometry. Here, again, a length—familiarly, the height of a column of mercury—is assumed to measure temperature as a physical magnitude, defined by dynamic theory, which corresponds *in a general way* with our sensations of warmth and cold. If the correspondence were exact in all cases, we should hardly need thermometers; and if there were no correspondence at all, it is idle to speculate as to what might have been the development of our concept of temperature as a measurable quantity. But the quantitative changes in sensation are none the less real, whether the correspondence with the thermometer follows some nonlinear function (such as the logarithmic relation of the Weber-Fechner law, roughly valid for some magnitudes within some limits) or whether there is no simple functional relation. In the nature of the case there can be no physical measurement of the feeling of temperature (or of the estimate of length); this is a matter of direct experience and of verbal reporting. Yet either judgment—that the temperature as felt shows a linear correspondence with that measured, that they are related by any other function, or that they are not related—proves with equal and complete conclusiveness that temperature as felt is quantitative (in the cardinal sense). The subject "knows" approximately—he can estimate—whether a second change in his feeling is equal to or greater or less than a preceding one, and experimental changes could be adjusted to seem equal; and there would literally be no sense in saying that any such judgment is wrong. We hold it to be self-evident that what has been said of temperature is true of every subjective variable, regardless of its nature or relation to a measurable physical variable as a cause—or in what sense, if at all, we attribute the experience to such a cause. Whenever our minds judge one experience to be greater, more intense, than another, it is always possible to distinguish between (approximately) equal and unequal degrees of change.

An illustration which seems made to order for expository purposes (and has been used) is the grading of examination papers, in any subject from arithmetic to any branch of aesthetics, or grading human performance of any kind. Of course, the effort to grade is an effort to quantify a magnitude which is assumed to be objective in some sense, in contrast with the mere subjective experience or feeling of the grader; estimation of merit must be distinguished from mere liking. But this fact is immaterial for the argument, as long as there is no conceivable possibility of physically measuring the "real" merit of the object or performance or of describing it in terms of physical qualities. We need not go into the special problem of the objectivity of values as magnitudes or inquire as to how far "real" values enter into economic desire and satisfaction or investigate the rela-

tion between the aesthetic merit and the economic (money) value of the same objects. What is essential is only the fact that grading is done, and on a linear numerical scale; this is conclusive for the fact of quantification and removes the main question from the sphere of argument. Manifestly, the activity is one of estimation, not of measurement, in any proper use of the word. The word "measure" ought to be used very cautiously in connection with distinctively human data, i.e., with respect to any but the simplest physical capacities of man, such as speed in running, the lifting of weights, and the like, and the ability to estimate measurable physical quantities. Averaging estimates or guesses is not measuring and should not be so called, though the notion of "reliability" implies objectivity of some kind.

Experiment shows that if the same person holds one hand for a brief interval in very warm water and the other in cold and then places both hands in water at an intermediate temperature, the latter will at the same time feel cold to one hand and warm to the other. But even such a fact has nothing to do with the quantitative character of the feeling of warmth or coldness in either hand or with the validity of its quantitative estimation by the subject. Where measurement is impossible, our confidence in the validity of estimates of magnitude or rank can itself only be estimated. It may well be true that the reliability of ranking is greater than that of estimation of differences in degree, as tested by repetition by the same or a different estimator. The essential fact here is that wherever it is possible to say of three "experienced data" of any kind, A, B, and C, that C is "greater" than B and B is greater than A, it is also possible to compare the differences, i.e., to judge (though perhaps with less accuracy) whether C is greater than B by an amount—a difference—greater or less than that by which B is greater than A. We certainly make such estimates in economic choice.[13]

We turn now to the relation between the first and second of our four possible views of the theory of choice—a purely behavioristic interpretation and one which runs in terms of "force." Early in the history of modern physics objection was raised to use of the concept of force, on the double ground that it is never open to direct observation and that it is not objective but animistic or anthropomorphic. It was (and is) pointed out that we observe or measure only the effects of forces and contended that it would be simpler and more candid to talk only about effects, i.e., equations of motion, in relation to observed and measured antecedents or conditions. The place of motive in economic choice presents a closely parallel problem. In mechanics the issue arises at the very beginning, in the question as to what it is that is measured in the second of the three primary units—grams or pounds. Those who repudiate the notion of force contend that the gram (or pound) is a unit of mass and that the word "force" is simply a shorter designation of the de-

[13] The writer knows of only one case of quantitative variation in a physical quality where it is possible to rank but impossible to space the ranks along a linear or numerical scale. This is the case of the hardness of solids as determined exclusively by the scratching test. In this case, and in any case where magnitudes are ranked and only the rank is given, no valid numerical correlation with any other series can be computed. Correlation between ranked series, or of such a series with any measured variable, rests on an arbitrary assumption that all the ranks are equally spaced along a scale.

Estimates of differences are fairly definite only within the range of direct observation. In this fact also there is a difference of degree from the comparison of primary magnitudes.

fining relationship, the product of mass by acceleration. The expression $f = ma$ should then be treated as a definition and not as an equality.

This reasoning is plausible, but any effort to follow the procedure advocated runs at once into insuperable difficulty; for, in fact, mass is not measured and not experienced directly, but only as force. In practice, the unit is a unit of weight and is measured with the balance or by elastic deformation (of a steel spring or the like). Theoretically, mass should be measured by comparing the accelerations of two masses when these "interact." But, unfortunately for the theory, interaction itself is never directly observed, or even inferred, without the mediation of some force. It has, of course, long been known that impact is no exception to this statement, that literal impact between rigid solids is both unreal and theoretically impossible, since it would involve infinite acceleration. (In modern theory mass would be infinite at a relative velocity equal to that of light.) The empirical phenomenon of impact involves either elastic or permanent deformation, and neither can be interpretively conceived without using the idea of force as an elementary datum. The palpable fact is that the most elementary mechanical phenomena cannot be thought of in purely empirical terms, in the meaning which our minds seem to crave, namely, *visual* observation. The impossibility of such a "behavioristic" view should be evident to reflection and has been pointed out by theoretical physicists.[14]

It may be admitted that the notion of force "seems" more anthropomorphic and subjective than other qualities of objects which seem to be more directly perceived. When we see, or picture in thought an interaction between two bodies, such as the familiar impact of billiard balls, we think we observe (see, literally or in imagination) the change in motion and only infer the operation of force. And the inference seems to involve "reading into" the physical process something from an imagined experience of our own—either tactile pressure or muscular effort. However, reflection makes it a serious question whether we do not observe force at least as truly and "primarily" as we observe anything, specifically, when we see objects. We certainly feel both weight and inertia in our own bodily members and in objects which exert pressure upon us or offer resistance to our efforts to change their state of rest or motion. It is noteworthy that the qualities early distinguished as "primary" are those perceived in this way, in contrast with visual properties as secondary; and it is an accepted doctrine of psychology that the visual recognition of physical objects in their external three-dimensional reality is learned through the education of the eyes by tactile sensation, pressure, and movement or muscular kinesthesis. In fact, no one has ever proposed a distinction acceptable to critical common sense between what we perceive and what we infer. We think we see objects, but if in thinking we go back of immediate (adult)

[14] See, e.g., a review article by H. Poincaré, "Les Idées de Hertz sur la mécanique," *Revue générale des sciences pures et appliquées*, VIII, No. 16 (August 30, 1897), 734–43.

Of course, all real, observable, terrestrial, physical phenomena also involve friction and loss of energy. This concept is even more metaphysical than that of force, specifically since it involves the notion of potential energy. The problem of friction and its analogue in economic phenomena will be touched upon later. We need not go into the modern replacement of the force concept by field-theory, beyond noting that hyperspace raises equal difficulty for common sense.

experience, what we really perceive is light waves or some physicochemical change in eye or nerve or brain. The difference between the cognition of force and perception by sight (and perhaps hearing) seems to be that one perceives a force only when it is acting directly on his own body, while vision (and in a sense hearing and smell, but not taste) "report" on objects at a distance. However, we usually do not see anything unless we voluntarily look at it (in contrast with hearing and smell); but we believe things "visibly" exist whether we momentarily see them or not, and the apparent anthropomorphism of force rests on an unwillingness to assume that they similarly exert force.

In human, and specifically in economic, behavior, motive—i.e., desire for things or their services or for experiences of "satisfaction"—is the analogue of force in mechanics. Objects of choice may be thought of as exerting a "pull" upon the subject and so causing a response in behavior. (Repulsions can always be interpreted in positive terms, and we need not inquire into the ground of the occasional negative quality of the feeling.) But in the field of conduct, the a fortiori argument for the reality of the force (motive) is irresistibly conclusive. If interpretive thinking cannot do without the notion of force as a reality in physical nature, it becomes arbitrary in the *n*th degree to rule motive out of our conception of the conduct of human beings, where everyone is directly aware of it in his own experience and has the most certain knowledge of its reality in others. Our knowledge of what is in other minds is more certain than that which we have of the reality of the physical world, and prior to the latter. All our commonsense knowledge of the world of objects and especially all of our scientific knowledge manifestly depend on valid intercommunication with other minds, since no observation is regarded as valid unless it is or can be confirmed through other observers.

Our thinking about conduct must conform to common-sense introspection and intelligible intercommunication, which always run in terms of "reasons" for action or choice, meaning ends or motives. In the discussion of conduct we cannot separate description from teleological interpretation—the "what" from the "why" in this sense—what is done from what is achieved or expected to be achieved. Motive in relation to conduct—as a form of answer to the question "Why?"—is an intermediate and ambiguous category, much like force in relation to motion. Under critical scrutiny motive tends to "go over" one way or the other, giving place either to a purely empirical (perceptual but not really physical) view of behavior as taking place in accord with scientific laws or to an idealistic, subjectivistic world view. But in the one direction lies naïve materialism and in the other "solipsism" —equally impossible positions.[15]

[15] To the earlier distinction between primary and secondary qualities—the former supposed really to exist in things, the latter only in the mind of the observer—a nineteenth-century school of thought added "tertiary" qualities to take care of values. Apart from the dubious character of the distinctions as drawn, this scheme still fails to take account of another distinction which is even more important for both theoretical and practical thinking. That is the difference between the mere fact of being desired and having "value" in some objective meaning. It is a distinction which everyone constantly makes, and cannot help making, though many will "argue" that value is "really" nothing but desiredness. The truth is rather that all perception or cognition of fact rests on value judgments, in the weighing of evidence, not different in kind from those of aesthetics or morals. This "reducing" process may go further; it is also familiar in pseudo-scientific argument that desire itself becomes merely a "tendency to react." Here "tendency" apparently has the meaning of a force,

There is a special reason (motive!) against admitting motive into the interpretation of economic choice, in that choices do not seem to correspond accurately with motives. This is true with respect to other persons, and also of one's own choices, viewed with detachment or from a later point in time. This discrepancy is partly a matter of error in choice itself and partly one of error in the assignment of motives, including one's own. Probably everyone makes choices "really knowing" at the time that he will be sorry afterward—or will feel sorry—rightly or wrongly! In physical causality the fact that we know a force only by inference from its effects means that discrepancy between the two is impossible. When any force known to be operating does not fully and accurately account for an observed effect, we confidently impute the difference to some other force, known or unknown. Why we do not spontaneously and finally do the same in the case of human responses raises the ultimate problem of *freedom*. With respect to freedom or will the essential fact is that we "know too much" about human motivation to consider it exhaustively interpretable in terms of antecedent physical conditions as causes. Especially, we know indubitably the complex fact of *error*. We have to assume that the behavior of inert objects is not affected by *effort* or by thinking which is *aimed* at *solving problems* and so is not like human choice, inherently subject to error. This also means that freedom in choice involves more than mere contingency or chance or caprice, and ordinarily more than "arbitrary" thought and action.

The philosophical question of whether the comparison of satisfactions (utilities) should be thought of as a comparison between magnitudes which exist separately and are quantified separately or whether the recognition of utility inherently involves a comparison has a certain parallel in the case of force. We are apparently unable to think of any force as existing and acting entirely apart from some other force, or a "resistance" of some sort (Newton's third law of motion). It is also evident that the idea of economic value, or utility, always arises out of the necessity of choosing between alternative "goods," more or less different in kind. The giving-up of an alternative good is the meaning of cost. The relativity of desires is more intimate than that of forces. But in mechanics forces are dealt with one at a time, and the same is true of desires in economics; any one desire or attraction is a distinct factor and the associated satisfaction an independent variable under any actual conditions of choice. (However, discussion of the psychological effect of variation in the consumption of a single good, under the condition that it is the only one consumed by the individual, in place of reasonable *ceteris paribus* conditions, is one of the "classical errors" from which theory needs to free itself.) Desire for a particular service might, of course, be viewed as a mutual attraction between the human being and the good, as in the case of masses, electric charges, or magnetic poles; but the economist should doubtless follow the common-sense procedure of locating the attraction in the "mind" of the human being. In fact, even physicists speak of the magnet one-sidedly attracting its armature, the earth

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or force component, if it has any meaning at all. In scientific economics, of course, we are concerned only with the quality of desiredness, without regard to any basis it may have in valuation in the higher sense or even to the "satisfaction" which may actually follow upon choice and action.

the apple, etc., where theory makes the attraction mutual.[16]

One or two observations on the use of physical analogy in economic analysis should be added, by way of warning, particularly with reference to the concepts of statics and dynamics and to units and dimensions. We have pointed out that the fundamental economic magnitudes have the nature and dimensionality of flow or flux, not of existent masses. In an economic system the forces and their equilibrium relate to rates of flow, i.e., the distribution of a current among alternative paths, under a (difference of) pressure or potential of some sort. There is no direct analogy with equilibrium between objects stationary in a field of force. The true physical analogy would require an elaborate construction hardly undertaken so far in the literature, to the writer's knowledge. It is not to be undertaken here, but one or two points call for mention.

Of the three elementary dimensions in (Newtonian) mechanics, only time carries over into economics with at all the same meaning.[17] As to space, economists speak of direction and velocity of change; but it seems impossible either to bring these notions into any intelligible relation with the three-dimensional field of Euclidean space or to formulate any usable conception of economic hyperspace. The analogy of mass, in relation to force, presents even greater difficulties; and we probably cannot formulate any usable analogy for physical friction, involving energy loss. The best "model" for an economic system would seem to be one based on the phenomena of electric current, generated by a large number of interconnected sources and distributing itself through a complex network of circuits. One should, of course, begin with the case of a single generator feeding a number of circuits, as the analogue for a Crusoe economy. At the outset the role of inertia would be ignored, as electromagnetic induction is ignored in Ohm's law stating the relations for electricity. The relation between potential, resistance, and flow—maximizing satisfaction under diminishing utility—will be less simple than Ohm's formula, because electrical resistance is invariant with respect to current; but it is quite manageable mathematically. Another serious difficulty lies in the fact that in the human case the treatment of the "source" itself, the human being, as either simple or constant involves heroic abstraction, even if we could think of our Robinson Crusoe as using only his own "person" in the satisfaction of his economic wants, ignoring all other instrumentalities. The difficulty centers in the concept of capital (the whole complex "source" itself) and its maintenance and/or growth or decline. (Capital theory is the central difficulty in any attempt at rigorous formu-

[16] For many problems in price theory, it is convenient and admissible to treat money as an absolute measure of value, hence to view both price and utility changes as entirely relative to money. This assumption gives rise to serious problems in accounting practice. The economist must have in mind, wherever it is relevant, that the value of money does change, in terms both of objective purchasing-power and of subjective utility. The ultimate practical concern of the economist (as of all scientists) is with "welfare"; but to deal with this he must first have a sound scientific theory of utility, both in relative and in absolute terms, on the analogy of a force causing and explaining choice but consciously known to the choosing subject. Ultimately, "satisfaction" must be conceived, for the purpose of economic analysis, as only one ingredient or factor in human well-being; others may, in fact, have greater practical importance.

[17] Professor Sorokin in his recent work, *Socio-Cultural Causality, Space, Time* (Durham, N.C., 1943), advocates developing a special conception of time for use in social theory.

lation of economic relationships and processes.)

Turning from theoretical to practical difficulties, it is actually quite unrealistic to think of the functional (cause-and-effect) relations between economic variables as remaining unchanged through a real change in any independent variable.[18] There is always a significant "lag" in time; and in the meantime other things will not remain "equal." The demand curve (our special topic in this paper) affords an excellent illustration, being undoubtedly the most solidly real of all the functional relations dealt with in economic theory. The individual curve for a particular good describes a theoretical position of equilibrium in the relation between price and quantity taken. In reality, any change in the price, unless infinitely gradual, will carry the rate of consumption to a point off the curve, and it will "tend" to return to the curve at a new point. But conceptual interpretation of the lag of consumption change behind price change involves a causal sequence bearing some analogy to the action of a force against a resistance in which inertia is combined with friction (opposing the redistribution of a flow among alternate paths). The result to be expected under stationary conditions would be "damped oscillations," settling down at a new point on the curve. The nature of the concepts required for interpreting such phenomena calls loudly for investigation, particularly with respect to the possibility of finding any magnitude which can be assumed to remain constant, on the analogy of the conservation principles of mechanics (with or without allowance for energy loss). This line of argument suggests a basis for a pure theory of economic fluctuations. But the realism of such theorizing would be severely limited because the heart of the phenomena in the human case is uncertainty, error, and speculation (with some analogy to mental inertia!) in the thinking by which economic behavior is controlled, and these are not considered to be present in mechanical processes.

For numerous and important reasons, economic theory cannot approach the analytical realism of mechanics—remote from the empirical facts and the conditions of practical problems as are the assumptions of the latter science. Motives are not analogous to forces, i.e., merely concepts for interpreting conduct, which could be left out, to yield an empirical description of the causal sequence in physical or behavioristic terms. As already observed, we "know too much"; we have direct knowledge, not only that motives are present but that they do *not* correspond with hypothetical forces connecting behavior with its antecedent conditions. Their operation disrupts the uniformity of sequence. In the first place, action rarely leads to exactly the intended result, because it is always affected by error, which also is of several kinds. And, beyond this fact, ends are never really given. Actual desires are partly a matter of curiosity—the urge to explore—giving rise to the paradox

[18] This is a convenient place for the important observation that price theory must explain a change in any dependent variable by a change in a really independent one, i.e., as the effect of some force impinging on the price system from without and to be explained or treated by some other science. No price change can be validly treated as a cause, except for changes in the situation of some individual or limited sector of the economy, where the price change is due to some cause entirely outside the area considered. Error in this regard is frequently met with, especially in the work of the earlier writers. Much of Ricardo's reasoning is nonsensical on this account. Of course, it is also vital to avoid the blunder of making incompatible assumptions as to the classification and interrelations of dependent and independent variables.

of expected surprise as an important element in motivation. A different matter is the problem-solving interest, the quest of the "right" answer to some question, which it is a sheer contradiction to treat as an end given in advance. Well-being is largely of this nature, the answer to an unsolved problem, to be sought through "intelligent" experiment.

Finally, the practical significance of economic theory is in the field of social action, not of individual conduct. Particularly in a democratic society the instrumental pattern of means and end hardly fits this problem at all. It would have some application, though even then a very limited one, if we could think of the social problem as that of an absolute dictator, entirely outside of society and viewing his "subjects" merely as passive instruments for his own purposes. (They would have to be "lower" than any real slaves or even beasts of burden.) In free society the primary objective is agreement on terms of association, and the secondary objective is agreement on "right" terms and on the "best" ends and procedures. Actually, association itself has only to a limited extent the purpose assumed in economic analysis—co-operation for the achievement of any ends, of individuals or of groups. To a very large extent it is a matter of formulating the rules of a game, in which individuals do indeed pursue ends, but ends symbolic in character, set up to make activity interesting, instrumental to this purpose, and in large part effective because of their conflicting or competitive nature. The intelligence involved in playing games is a very different kind of faculty from either technical-instrumental rationality or the thinking used in apportioning means. Incidentally, the ability to invent games or improve the rules is much less common in the human species than these other capacities—which still do not exhaust the ambiguity of the word "intelligence."

V. CONSUMER'S SURPLUS

The consumer's surplus idea was doubtless first adumbrated by Dupuit; but the term and the classical treatment come from Marshall, and the general observations to be offered here will be oriented primarily to his treatment. It has extremely little practical significance, but a correct exposition is useful in bringing out the relations between the individual demand curve and indifference curves, with which it is much confused. It may also be useful for the pure theory of monopoly, in connection with perfectly classified monopoly price.

Marshall defines the concept as the excess of the price which a person would be willing to pay rather than go without the thing, over that which he actually does pay (*Principles* [8th ed.], p.124). We shall see that this definition is incorrect as well as loosely stated. The amount by which a person's total expenditure for a good under demand conditions (buying freely at a given price) is less than he would be willing to pay for the same amount rather than do without it altogether does not correspond with the value to him of having the good available at the price rather than unavailable—other conditions being the same[19] —and the latter is the essential idea.

There can be no question of the "theoretical reality" of the concept of con-

[19] For simplicity we assume that all the individual's income is spent for consumption (no saving) and also, of course, that we are comparing an initial with a final state of equilibrium in the individual's use of his income. We need not consider here the highly problematical use of the concept in connection with collections of commodities and/or groups of persons, as in the theory of foreign trade.

sumer's surplus, as defined, and it would need to be considered by a rational individual in the situation used by Marshall as an illustration. That (as will be recalled) is the case of a man choosing between living in a modern city and in a primitive community (central Africa) where the products available are assumed to have the same prices but where the same money income purchases less "value" because some products are not to be had. (To make the comparison valid, we must assume that there are no compensating advantages in other uses of income and that the choice is permanent and the income the same, so as to exclude temporary residence in the primitive community and saving for later expenditure in the higher civilization.) The problem is to find an unambiguous measure or expression for the advantage, in terms of money.

One difficulty in connection with Marshall's theory is that of forming any clear and defensible conception of what is meant by neglecting the change in the marginal utility of money. In the main argument, based on the purchase of tea for domestic consumption, which is introduced "in order to give definiteness to our notions" (*Principles*, pp. 125–27), the object seems to be to set up the assumption that there is no difference between a demand curve for tea (under the conditions of free purchase) and a marginal utility curve or an indifference curve in the price form. This is also clearly implied in the discussion of the diagram in his footnote on page 128. But the whole argument is economically nonsensical; to make the various curves identical or to give meaning to the area under the demand curve, we must practically assume that all the curves are horizontal; and this assumption not only defies the facts but eliminates consumer's surplus altogether.

A second interpretation of the Marshallian assumption is adopted in a brief and ingenious discussion by A. Henderson. It is that "the marginal rate of substitution between X and money is independent of income."[20] This view seems to be neither a reasonable interpretation of Marshall's position nor economically defensible. It would make the demand curve and the indifference curves independent of the individual's income, and, as argued above, this would also make the consumption independent of the price. The most plausible view would again treat the indifference-combinations curves as straight lines, the other curves as horizontal and coincident. (It is geometrically possible to introduce, respectively, curvature and declining slope, as Henderson does.) The assumption that the demand has neither income nor price elasticity is not impossible, as an approximation, for an unimportant commodity over a limited range. That is, within this range, the consumer may buy approximately the amount of X he would consume if it were a free good, while at a lower income or a higher price he will not buy it at all. If the assumption is generalized, it means that the consumer's only response to price or income change will be to add fixed amounts of different goods to his budget or to drop them, as the case may be.

A third possibility is to take Marshall as meaning quite literally what he seems to say, most explicitly in his mathematical note (p. 842), namely, that "the mar-

[20] See "Consumer's Surplus and the Compensating Variation," *Review of Economic Studies*, VIII (1940–41), 117–21, esp. 119, n. 1. Professor Lange called my attention to this paper. I have found it helpful, in spite of inability to accept some of the author's conclusions, for reasons which will presently be indicated in part.

ginal utility of money to the individual purchaser is the same throughout." That is, money is assumed to have an "absolute" marginal utility in the consumer's equilibrium position from which we start (with or without the opportunity to purchase X freely at a fixed price), and this magnitude is assumed to be invariant with respect to the amount of income spent for X, as the price of X varies from zero to infinity.[21] Whether the change so neglected would really be negligible or not manifestly depends on the importance of X in the consumer's budget. This, in turn, is partly a matter of the total number of commodities consumed, partly one of the intrinsic qualities of X, and partly of its complementarity relations with other goods. Marshall explicitly makes an exception for "commodities some supply of which is necessary for life" (p. 133, n. 1). He apparently fails to recognize that necessity is entirely a matter of degree or that no particular commodity as bought in the market under ordinary conditions is necessary; finally, in assuming that we can know the individual's utility (satisfaction) function for money, he fails to see that income as a whole is in a sense necessary, but not in any definable amount. His suggestion, that we take the necessary supply for granted and estimate the total utility of the excess over this amount, must be applied to money, not to a particular commodity, and must be interpreted to mean an income which would actually yield zero satisfaction.

The problem of consumer's surplus is that of finding a monetary measure or expression for an increment of total satisfaction which accrues to a consumer through having the opportunity to purchase a freely chosen amount of a particular good at a particular price, in comparison with a situation in which the good is not available and all other conditions are the same. In the second situation he will spend the same amount of money on other goods at the same prices (but not necessarily quite the same list of other goods), freely distributing his expenditure among these. The problem lies in the field of value dynamics, surveyed in Section II above, not in that of price-quantity relations under given conditions. To begin with, it is impossible

[21] This assumption seems to be implied by the statement that "in mathematical language the neglected elements would generally belong to the second order of small quantities" (*Principles of Economics*, p. 132, n. 1). Marshall goes on to chide Professor Nicholson for not recognizing "the legitimacy of the familiar scientific method by which they are neglected." In spite of diffidence in challenging Marshall—and Pigou (*Economics of Welfare* [1st ed.], p. 935)—on such a matter, the present writer must suggest that this mathematical argument is invalid. The theory of orders of infinitesimals does not seem to be applicable unless total utility is assumed to be represented by an algebraic expression of a fairly simple type, and this clearly cannot be done. The question of what can be neglected, and in comparison with what, is purely one of fact; and the facts are magnitudes which are a matter of estimation only, and their importance, absolute or relative, varies indefinitely with the particular good in question and depends on many other conditions.

(This matter of what magnitudes are practically negligible is of great importance for other problems in economic theory where unknown functions are involved, notably the conception of perfect competition among producers. It is hard to give much meaning to elaborate curves of total and marginal cost for a firm assumed to be of negligible size, which means that the whole diagram reduces to the area of a point!)

In sec. 4 (pp. 132–33) Marshall discusses as an exception the effect of a rise in the price of X, specifically in connection with the "Giffen paradox." Here, as the price of X increases, an increased quantity of X is purchased—the consumption of bread by very poor families being used as an illustration. As our previous argument has shown, what this case really illustrates is the confusion which results from drawing a demand curve on the assumption that all other prices are constant. What happens in such cases is a consequence of a disastrous fall in the value of money to the buyers affected, though not necessarily connected with a change in its value in the social economy, as measured by any general index number. From the standpoint of the theory of demand, it is the spurious problem of the "income effect."

literally to measure in money a change in the total utility of an income which itself is expressed in money. The only problem which can be pictured as real is that which is indicated by the third assumption we have been considering. We must measure a change in total satisfaction in units of the absolute satisfaction yielded by an increment of money income under some given conditions, assuming that this magnitude is not changed by the actual change in the use of the increment of income in question.

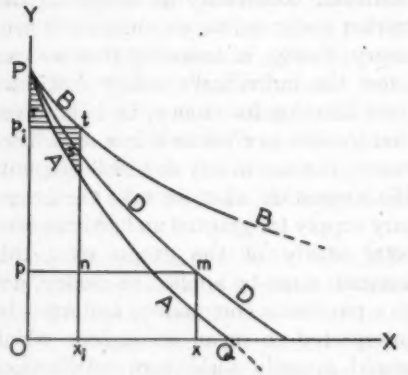

FIG. 2

Of course, it would be changed, more or less. If the change is substantial, the result is merely that our measurement still runs in terms of the original value; it will not become relative to the actual new value.

To handle this problem analytically, it will be useful to have in mind three curves, as shown in Figure 2. Curve *A* shows the variation in the relative marginal utility of good (service) *X*, measured by money. It is really an indifference curve, being drawn under the condition that the subject actually purchases each successive small unit of *X* at the maximum price he is willing to pay, after buying the earlier units seriatim on these terms. Curve *B* shows the same facts but with prices averaged out. It is so drawn in relation to *A* that any three-cornered area, *r*, is equal to the area, *s*, for any point, p_i (see shaded areas). That is, the ordinates of *B* show the highest price at which any quantity of *X* can be sold to the consumer, if he is free only to take or leave the whole amount. (We do not go into the meaning of curves *A* or *B* beyond the point *Q*, where *A* intersects the X-axis.) *D* is a demand curve. We cannot draw this curve from the data of the other two. We know only that it will run between *A* and *B* except for the terminal point *P* on the vertical axis. This means that at any positive (relative) price at which the consumer buys good *X* at all, he will buy less of it if free to choose the amount than he can be made to buy if he must take all or none at a maximum average price (or the price he will pay for any amount is less than he could be made to pay under the more restricted terms of choice). But the amount he will freely buy is greater than that which would have the same marginal utility in terms of money at his stopping-point if he bought all the earlier units seriatim at the maximum price for each in turn (or bought the whole block at his maximum total or average price). This is because under the demand condition he will have money left after reaching the terminal point of the second condition and will spend some of this for *X* (if all goods are "simple"). This last fact is a consequence of the existence of diminishing utility and of consumer's surplus.

The consumer's surplus obviously is *not* measured by the three-cornered area bounded by the price axis, the demand curve, and the upper boundary of the expenditure rectangle *Opmx*, *Ox* being the amount purchased at price *p* under de-

mand conditions. In fact, *the area under a demand curve has no economic meaning whatever*. Consumer's surplus as a subjective magnitude is the difference between the total satisfaction yielded by the quantity of a particular good freely purchased at any price and that which would be secured by freely spending the *same amount of money* for other goods at (just below) the actual uniform margin. In terms of money it must be the money value of this difference. The second alternative is, of course, identical with spending the same money for good X under indifference conditions (however represented graphically), which by definition makes it a matter of indifference what quantity of X is purchased, including zero amount. The surplus should not be measured by the difference between two different money expenditures for the same quantity of X, since this result differs from the value determined by the other comparison.[22]

To obtain (on this form of diagram) the money measure of the difference—the surplus—we must first locate the point t on curve B, which subtends with the two axes a rectangle of the same area as the expenditure rectangle under the demand curve for the given demand price p. The magnitude sought is, then, the area of the rectangle cut off from this total-expenditure rectangle by the ordinate of this point, i.e., at x_i. It is the area of the rectangle x_inmx. The "indifference expenditure rectangle," Op_itx_i, has, of course, the same area as that under curve A between the price axis and the ordinate at x_i.[23]

Since, as repeatedly emphasized, the curve of marginal utility relative to money, or the indifference curve in any form, cannot be drawn from demand data, all this procedure is purely formal and without practical meaning. Its only use is to clarify certain analytical concepts and to prevent making certain errors. The primary error in Marshall's analysis, and in the textbooks which have commonly followed the same procedure, is that of identifying or confusing the demand curve with the curve of marginal utility in terms of money and of treating the area under the demand curve as the measure of total satisfaction.

A theoretical measure of consumer's surplus could be derived more simply in graphic terms by using a series of indifference-combinations curves for quantities of money and of good X. It must be emphasized that the procedure would still be purely hypothetical, since market data do not provide the facts required for drawing indifference curves. These

[22] See Hicks, *op. cit.*, pp. 38–40; also Henderson, *op. cit.*, p. 118. It is rather strange that Henderson slips into this error after making the statement in italics on the first page of his article. A minor slip in Henderson's argument is the statement (p. 118) that the consumer's surplus, defined as the difference in two expenditures for the same quantity of X, is "the maximum increase in return which the seller could obtain through negotiating all-or-none bargains with [the] consumer." It is the maximum increase *for the same amount of X*. The maximum without this unjustifiable condition would depend on the cost curve of the seller and on special conditions of bargaining (see below, p. 316).

[23] We might have proceeded by locating hypothetically the one appropriate point on curve A and drawing a horizontal line p_it of the right length to yield the equivalent equal-expenditure rectangle without drawing the whole curve B. If the marginal utility under indifference conditions is assumed identical with the marginal utility under demand conditions, for the same quantities, curves A, B, and D will all coincide, and consumer's surplus will disappear.

Professor Viner has pointed out the fallacy of confusing the demand curve with the equivalent of an indifference-combinations curve (see *Studies in the Theory of International Trade* [New York, 1937], pp. 573–74). In classroom lectures he also presents a graphic measure of consumer's surplus, showing the difference.

might be had only from actual experimentation with strictly classified monopoly price. But it would also be necessary to establish conditions under which the buyer would not know or suspect the nature of his situation or in which purchasers are, in fact, so numerous that any one is negligible to the seller, while, at the same time, purchase for resale is somehow excluded. Otherwise the situation will be one of bargaining and "bluffing," between a monopoly and a monopsony, and the price will be indeterminate within a range depending on the details of the two curves. However, for the purpose of clarifying analytical procedure (as before) we may impose the arbitrary conditions called for and proceed.

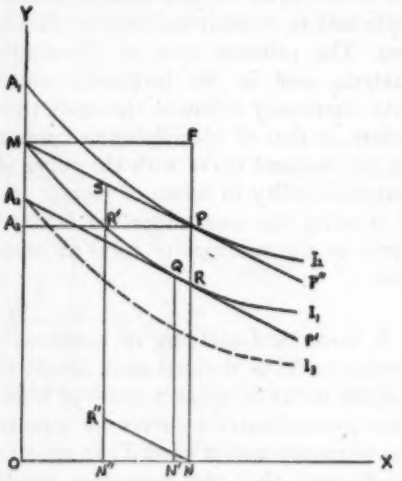

FIG. 3

Our figure embodies the same basic diagram and notation employed by Henderson, and before him (in an incomplete form) by Hicks (Fig. 3). The point M on the vertical axis shows the money income of the individual. The line MP'' is a line of slope p, where p is the price of X. It is tangent to some indifference curve I_2 at P, which point marks the position of equilibrium for the consumer under market-demand conditions, where ON measures the amount of X bought. (For clarity the diagram is drawn off-scale, with vertical distances greatly exaggerated.) Curve I_1 is the indifference-combinations curve of the individual for X and money, corresponding to income M. The vertical distance PR is, indeed, the excess amount of money the individual would pay for ON of X offered as an indivisible block, over the amount FP which he does pay in the free market. But it is not the consumer's surplus. Henderson is correct in saying that "if the individual had spent FR in buying ON of X he would have been just as well off as if the commodity had not been available, whereas in fact he only had to spend FP on it." But he overlooks the fact that the individual would also have been just as well off at any other point (than R) on indifference curve I_1 (and as well off at any other point than P on I_2). Yet he recognizes that the money measure of the difference in situation represented by the two curves is not the same at any two points on either—unless the curves are arbitrarily drawn in an admittedly indefensible way. The correct comparison with free purchase is clearly the point at which he spends the same amount of money for less X and not where he spends more money for the same amount of X (in both cases paying a higher average price but not the same price in these two cases); for, if X had not been available, he would have spent the same amount on other things.

To find the money measure of consumer's surplus, defined as we have defined it, we draw the horizontal line PA_3, cutting the indifference curve I_1 at R'. Spending the same amount of money FP under the indifference conditions, the

individual would buy A_2R' (or ON'') of X instead of ON; i.e., he would buy $N''N$ less than if he bought under market conditions. The money value of this difference at the given price is $N''R''$ (NR'' being drawn parallel to the original price line), or it is $R'S$. This is less than PR even if the curves are drawn according to Henderson's interpretation of Marshall's assumption, i.e., so as to have the same slope for the same X value, hence a uniform vertical distance between them.

A still more defensible money measure of the difference in satisfaction represented by two indifference-combinations curves is afforded by the notion of a "compensating variation." The term was introduced by Hicks as the best way of looking at consumer's surplus but was mistakenly identified by him with his graphic measure of the surplus, the line segment PR. As Henderson shows, the magnitude has two values, both different from that of the consumer's surplus as defined by Hicks and Henderson and also different from our "correct" definition. The measurement calls for a system of indifference-combinations curves beginning or terminating on the Y-axis or money axis, and it derives its superiority from this feature. (Hicks drew only one of these curves in this way, the one at point M.)

Expressed in words, the compensating variation might, in fact, take any of four different forms. First, we may consider the position of an individual with an income M and without the privilege of buying X freely at a certain market price and may ask either (I-a) what is the maximum amount of income he would be willing to give up in exchange for the privilege, or (I-b) what is the minimum additional income he would accept as an equivalent to getting it. Second, we may consider the position of an individual who has an income M and also has the privilege in question and may ask (II-a) how much additional income he would demand to give it up, or (II-b) how much of his actual income he would be willing to give up as an alternative to parting with the privilege. There are actually but two magnitudes, since I-a and II-b are identical, as are I-b and II-a. Henderson works out, first, I-a (equals MA_2) and then II-a (equals A_1M), which he strangely says is also the Marshallian consumer's surplus. It should be noted that two of the four different magnitudes—i.e., Henderson's *second* form of the compensating variation (II-a or A_1M) and the Hicks-Henderson consumer's surplus (PR)—will be identical if (and only if) the indifference curves are straight lines identical with the price line or are otherwise so drawn that the vertical distance between them is the same for all values of X. The other two magnitudes will be different from both, as well as between themselves, unless still more implausible conditions are imposed.

The two compensating variations are different because an individual buying X freely at the same price at different income levels will buy different amounts (if it is a "simple" good or one of any probable utility composition). The two values of the compensating variation involve the two intervals between three successive indifference curves. For an individual to be on I_1 with the privilege of buying X freely at price p is equivalent to being on I_2 without the privilege; and being on I_1 without it is equivalent to being on a lower curve I_3 passing through A_2 with the privilege open. But movement from M to A_1 represents a greater monetary difference on the Y-axis than movement from M to A_2, be-

cause more X will be bought out of a higher income at the same price, because, in turn, the marginal utility of money is lower compared with that of a given supply of any single good.

The vertical or monetary distance between two indifference curves, or the order of two such distances, at other points cannot be inferred from the magnitudes along the axis of money. This is true whether or not a linear scale is assigned to the suppressed third axis (of utility or satisfaction). The indifference curves are projections upon the base plane of contour lines on a surface, defined either by a utility function or by some index function with the properties considered essential. In either case the shape of the curves depends on the character of the good X and its relationships with other goods available for purchase. We can draw curves spaced equally, or in any other way, along the money axis; but their vertical spacing anywhere else obviously depends on their shape. About this we know in general only three facts. They always have a negative slope (within the significant range), they do not intersect (or meet), and they *cannot* have a uniform slope and vertical spacing for different values of X. This third feature would involve zero income elasticity of demand for X; and this, as we have seen, is conceivable only for a good with a complex utility so arranged that displacement of other goods would exactly offset the diminishing utility of the various component types of satisfaction which it yields.[24]

The utility value of a difference in money income is still another matter. This would be measured along a third axis perpendicular to the plane of a diagram of the type here discussed.

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[24] We should note, finally, that the notion of maximizing consumer's surplus cannot be entertained (as so often assumed) as a description of rational consumer behavior. Any aggregation of distinct consumer's surpluses is without meaning—though conditions might justify or require treating some complex of goods as a unit.

To pursue the analysis further would lead into a discussion of the familiar "antinomies of value" of Wieser *et al.* The suggestion that total satisfaction be increased by taxing goods of inelastic demand and subsidizing consumption of those of the opposite character would justify the taxation of free goods so as to make the consumer pay for them. It is hard to deny that this might actually increase total conscious satisfaction, but it would hardly increase real well-being to have one's total consumption cut down to famine conditions. In the ordinary course of events, one must agree with the position of Nicholson (see Marshall, *Principles*, p. 127, n. 1), that the consumer is not conscious of receiving the "free satisfaction" described by the theory of consumer's surplus. It is a real antinomy of economic psychology, but an indubitable fact, that our feelings of satisfaction depend more on *changes* in income (or particular prices) than on the absolute level—and surprise, in relation to established expectations, is also vitally important, irrespective of the accustomed standard.

STRIKE PROFILES

JOHN V. SPIELMANS

STRIKE figures, as usually presented, have a peculiar way of not producing a distinct picture. The three basic data considered are the number of strikes, of workers involved, and of man-days idle. As regards these, the idea prevails that a decrease in any of them is a good sign; an increase, a bad sign. But, since all three can vary rather independently of each other, one can often derive from the same figures cause for satisfaction or for dissatisfaction, depending on one's temperament, bias, and purpose. If A laments an increase in the number of strikes, B is gratified by a decrease in the number of workers involved; but, when next year A finds an increase in the number of workers involved an occasion for sour comment, B cheerfully points to a decrease in the number of man-days idle or to the fact that the number of strikes was 3 per cent less than the average over the last ten years.[1]

[1] During the present war, where the evil of strikes is felt chiefly in the loss to production, the most significant strike datum is clearly the number of man-days lost in essential industries, or, more significantly, the percentage of the total of man-days lost in such industries. Under ordinary peacetime conditions, however, the man-days lost through strikes are not, in this sense, a measure of the strike evil, for most industries do not normally operate at full employment capacity, so that time lost through strikes often constitutes merely a small part of the idleness due to other causes, notably slack markets. For example, in the strike-ridden coal-mining industry between 1900 and 1920 idleness due to strikes was only about one-eighth of the total idleness (1,053,577,000 man-days idle due to other causes; 124,747,000 man-days idle due to strikes) (*Monthly Labor Review*, XIV [1922], 569, quoted from a report on coal production in the *United States Geological Survey*, February 4, 1922).

In this article a new method of presenting strike data is proposed which seems to lead to a more distinct, because more integrated, picture of the strike phenomenon than the mere "greater-less" comparison of the several strike figures as such.

I. STRIKE RECTANGLES AND STRIKE PROFILES: THE METHOD

We begin with the number of workers involved in a given class of strikes and present it on a suitable scale as a length segment placed horizontally. Depending on the purpose of the inquiry, the scale may be either an absolute one—say, 1 inch to every million workers involved—or a relative one—e.g., 1 inch for every 10 per cent of all workers involved in strikes or for every 10 per cent of all industrial wage-earners in the country in question.

Next we take the number of man-days lost by the workers in this class of strikes. This two-dimensional datum—men times days—we represent two-dimensionally also in our graph, namely, as the area of the rectangle whose one side is the number of workers involved. The other side of this rectangle is therefore found by dividing the area by the first side, that is, by dividing the number of man-days idle by the number of workers who were idle.

This quotient of man-days idle over workers involved is a time dimension. In fact, it is the number of days which would account for the total of man-days idle if all workers in the particular class

of strikes had been idle the same length of time. One might call it, therefore, the "average," or the "effective" duration of idleness, or, in accordance with the mathematical term applied to this type of average, the "mean value"[2] of the duration of idleness. This "mean idleness" we shall regard as a statistical measure of the duration of strike idleness in the given class of strikes, postponing to a later point in our inquiry the question as to how the actual duration of idleness is distributed relative to this "mean idleness."[3]

A single "strike rectangle" thus shows jointly three important data pertaining to the given class of strikes: its area gives the number of man-days idle, while its sides show respectively the number of workers involved in the same class of strikes and the duration of their mean idleness. Accordingly, these rectangles are significant not only as to their magnitude but notably also as to their form: wide or narrow rectangles mean many or few workers involved; high or low rectangles mean a long or short duration of mean idleness. An area, for instance, of 1,000,000 man-days may be 1,000,000 men wide and 1 day high, or only 10,000 men wide and 100 days high. A mere counting of man-days idle would judge the two situations as "equal"; a counting also of the workers involved would judge the first as "greater," and hence as "worse." But by taking into account, also, the time dimension of the height of the rectangle, the opposite evaluation might be more justified. Indeed, very high—months-high—strike rectangles reveal the preponderance of prolonged strikes—strikes which, at least in the American setting, are apt to be bitter and violence-breeding, with no meeting of minds and usually with great distress to the workers, their families, and their communities, and with great, because protracted, disturbance to the industries in question, even though they may not be numerous. Low strike rectangles, on the other hand—say of a few days' height only—reveal the preponderance of brief, demonstration-like strikes, readily settled, with but little disturbance to the individual workers and industries, even though there be many—that is, with total economic losses thinly spread, and hence with small social disturbance only.

It thus appears that the frequently neglected time dimension, figuring as the height of our strike rectangles, is of great significance in judging "the evil that strikes do"; that, at least under conditions as we know them in the United States, low strike rectangles, even though wide, are likely to reflect a healthier situation than very high rectangles, even though narrow.[4]

[2] If a function $y = f(x)$ is represented as a curve, the area A under the curve, bounded by the x-axis and the two ordinates $f(a)$ and $f(b)$, is given by the expression $A = \int_a^b f(x)dx$. The "mean value" $\bar{y}$ of the function in the interval from a to b is then the height of the rectangle constructed over the base $(b - a)$, whose area equals the area under the curve; that is $\bar{y} = \left(\int_a^b f(x)dx\right)/b - a$. In our case the function $y = f(x)$ is the distribution of the idleness (y) among the workers (x). The integral is truly the finite sum $\sum_1^N f(x)dx$, where N is the total number of workers involved in the class of strikes.

[3] See below, p. 325, "Duration Profiles."

[4] In the pictographs used to aid the reader to visualize the magnitude of the strike figures, the number of man-days idle is sometimes presented as a manikin with a sun on his head; e.g., 1 sun-bearing manikin for 1,000,000 man-days, 2 such manikins for 2,000,000 man-days, etc. This presentation fails to bring out the difference in situation between 1,000,000 men idle 1 day and, say, 10,000 men idle 100 days. In fact, n million man-days could be presented equally by n manikins bearing 1 sun each, or by 1 manikin bearing n suns, or, more generally, by k manikins bearing n/k suns. The hardship of 1

Up to now we have made no use of the third basic datum of strike statistics, the number of strikes. We may still do so—for example, by writing this number inside a corner or near the strike rectangle to which it belongs. Taken together with the data presented by the dimensions of the rectangle, this figure will then show, at one glance, in how many separate strikes the workers involved lost how many man-days. Or, less accurately, but better integrated with the graphical scheme as such, one can rule the strike rectangles with vertical lines, each representing a certain number—say 100—strikes. The density of these lines will then be an indicator of the "average magnitude" of the strikes: a great density reveals the preponderance of small strikes; a small density the presence or even preponderance of large-scale strikes.

Under either scheme, it is to be noticed, the number of strikes does not affect the form or size of the strike rectangle and thus plays only an incidental role in our presentation. This fact, however, we regard not as a shortcoming but rather as an advantage. For the number of strikes is not a significant datum in the same sense as are the number of workers involved and the man-days idle, because of the widely varying magnitude of the unit "strike." Indeed, this unit may range from a few workers[5] to hundreds of thousands of workers involved. A walkout of 6 men for a day and a month-long strike of half a million coal-miners count equally as "one strike."[6] Hence, it is only in immediate connection with the number of workers and of man-days that the "number of strikes" is a significant datum.

Of course, for a given country, with a fairly constant organizational setup and with a large enough number of strikes to insure statistical regularity, the frequency distribution of strikes in various magnitude classes may be sufficiently constant so that the total number of strikes may, within narrow enough time limits, serve as an indicator of the variations of strike activity. But, where these conditions are not fulfilled, especially when comparisons are made over long periods of time or between different countries, there the "number of strikes," unqualified as to magnitude, is doubtless far inferior as a yardstick of strike activity to the other two data used in our graphical scheme: the number of workers involved and of man-days idle.[7]

So far, we have spoken of "classes of strikes" without specifying their nature.

manikin bearing a heavy load of n suns, however, is apt to be far greater than the sum of the small hardships of n manikins each bearing 1 sun only.

[5] At present the U.S. Bureau of Labor Statistics reports as "strikes" stoppages which involve at least 6 workers for at least 1 day. Between 1914 and 1926 its figures included also stoppages of less than 6 workers and idleness of a few hours only. See *Strikes in the United States, 1880–1936* (Bureau of Labor Statistics Bull. No. 651 [1937]), p. 36.

[6] To complicate matters further, the question as to what constitutes one or several strikes is sometimes a moot one and depends otherwise on the accidents of the organizational setup in the industries in question, notably on the degree of centralization of the unions and employers bargaining collectively, that is, on the size of the bargaining units. While a strike of several hundred thousand coal-miners against scores of employers in several states may count as a single strike—as may, for that matter, a general strike of millions of workers against thousands of employers—a strike of 500 taxi-drivers in a city, organized in two rival unions and employed by three different companies, might figure as 6 strikes.

[7] Inasmuch as strikes, unless broken into magnitude classes, are not a significant statistical unit, duration averages based on the duration of individual strikes, such as the "average" or the "median" duration of all strikes, are not really significant either. It is to be noticed that the above-defined "mean idleness" has no reference to the duration of individual strikes but only to the total idleness of all workers involved in the particular class of strikes.

In fact, there is a considerable variety of classes which one may use, depending on the purpose of the inquiry. One such class which any inquiry is likely to be interested in is that of all strikes during a given year in a given country. Constructing the strike rectangles for successive years and placing them side by side, one obtains a *total strike profile*, which gives at a glance an integrated summary picture of the numerical aspects of the country's strike history. If the width of the rectangles is made to represent the workers involved as percentages of all industrial wage-earners in the country, such profiles afford a good comparison between the over-all strike situations in various countries.

Next, one may present the strike picture in more detail by classifying the strikes during a given year in various ways and thus obtain a variety of *annual strike profiles*. For instance, one may classify strikes according to their duration, or their magnitude, or their outcome; or according to the issues involved or to the agencies through which they were settled; or according to industries, or to states, or to labor organizations involved; or still others. In fact, any strike classification for which the necessary data are available can be presented as a profile in our sense: the number of workers involved and of man-days idle.

II. STRIKE PROFILES: THE METHOD APPLIED

In the following pages we are presenting a number of actual strike profiles. Some of them are given as completely as the figures on hand permit, for the sake of the factual information which they convey. Others are given more as examples to illustrate the method.

As regards the United States, we are limited to the time since 1927, for it is only beginning with that year that the Bureau of Labor Statistics has recorded the number of man-days idle, which is essential to our profiles. This black-out of the American strike profile before 1927 is regrettable because it deprives us of the comparison with the time of the first World War and the postwar years and altogether with a long enough period before the New Deal.[8]

1. *Total strike profile for the United States.*—Figure 1 shows the total strike profile for the United States from 1927 to 1943.[9] It begins with some very high, narrow rectangles during the Coolidge era, when the unions were at bay against the triumphant "open shop." These are followed by the very narrowest rectangles during the early years of the depression. With the Roosevelt era comes a sudden change to much wider and lower rectangles. Finally, there are the very low and—in the case of 1943—very wide wartime rectangles.[10]

[8] Since the number of workers involved is on record (although with far less accuracy than at present) as far back as 1914, or intermittently even to 1881, one could plot the width of the earlier strike rectangles, leaving their height undetermined. (See below, Fig. 6.)

[9] Based on the figures of the Bureau of Labor Statistics, *Monthly Labor Review*, LVI (1943), 961, Table I.

[10] As regards 1943, there is a question as to the strike figures. The large number of workers involved is partly due to the four general coal stoppages: May 1–4, June 1–7, June 21–23, and November 1–3. In these essentially the same individuals were on strike four times. If one counts them (as is the usual practice in strike statistics) four times, one arrives at the figure 3,337,000 workers involved; by dividing the reported 13,500,000 man-days by this number, one obtains a mean idleness of approximately 4 days. If, on the other hand, one counts the (roughly 450,000) miners who struck four times, only once (treating the four stoppages as one controversy), one arrives at a total of only 1,985,000 workers involved, and hence at approximately 7 days' mean idleness. The latter method was used by the Bureau of Labor Statistics, *Monthly Labor Review*,

FIG. 1.—Total strike profiles, United States, 1927–43

The question presents itself as to whether this change from narrow and high to wide and low rectangles is to be regarded as a significant trend or merely as an accidental fluctuation.

We incline to believe that this change in pattern does reflect a trend, namely, the rapid growth of union organization under the New Deal. This has operated in at least two ways in increasing the width of the rectangles:[11] on the one hand, it has occasioned much additional strike activity over union recognition (Wagner Act notwithstanding) and other organization issues;[12] on the other, it must have increased the magnitude of strikes due to the increasing scale of collective bargaining.[13] While the former of these influences may be expected to abate as unionism becomes more unquestioningly established, the latter might easily continue to operate.

The diminished height of the profile,[14] on the other hand, seems to reflect the progress made in these years in the settlement of disputes through orderly collective bargaining with organized labor, aided by governmental mediation.[15] Under this setup many, especially large, strikes are apt to take on more the character of demonstrations, serving notice of solidarity in the determination to insist or resist, or of bringing grievances to public attention, rather than an outright struggle to the bitter end.[16] This character of strikes, as demonstrations rather than contests of strength, is very apparent in the low wartime rectangles.

LVIII (1944), 349, and "Strikes in 1943," *ibid.*, pp. 927–47. The former figures (represented dotted in the profile) were published by the Associated Press, January 6, 1944, as obtained from the records of the Bureau.

[11] Previous to 1927 there were also years with large numbers of workers involved in strikes. In fact, traced backward from 1927, these numbers continue small until 1924, while during the postwar and war period they were very large, with an all-time maximum of 4,200,000 in 1919. (See below, Fig. 6.)

[12] See below, Figs. 5 and 7.

[13] This trend, unfortunately, cannot be numerically established from the available figures. The Bureau of Labor Statistics' analysis of strikes according to magnitude gives only the number of strikes per magnitude class, not the number of workers involved. The number of strikes alone, however, does not answer the question as to what extent more workers are involved in strikes of greater magnitude. Nor does it show a sustained trend as regards the percentages of the number of strikes in the several magnitude classes.

[14] This diminishing height, it is true, is made unduly spectacular by the very high rectangle at what happens to be the beginning (1927) and the very low rectangle at what happens to be the end of the profile (1943). But, even aside from these two rectangles, the effect is very pronounced. There is a certain irony in the conjunction of these two extreme rectangles. Both represent chiefly coal strikes. In 1927 some 200,000 miners were holding out for months against wage reductions and lengthening of hours deemed necessary because of a collapse of coal prices. This strike was a bitter and fierce struggle, marked by rioting, forced evictions, shootings, and imprisonments of strike leaders (notably in Colorado). (See *Monthly Labor Review*, XXV [1927], 568–69, 837–38, 1307–8; XXVI [1928], 113–16, 319–21.) In those strikes the approximately 23,000,000 man-days idle, however, did not mean losses in essential production, but mainly great suffering to the mining communities, for many mines were operated at the desired low rate of production on an open-shop basis protected by armed guards and sweeping court injunctions. At that time the miners were told that, strike or no strike, "the public was abundantly supplied with coal at very low prices" and that "wages were governed by the laws of supply and demand over which the owners have no control" (from a letter by S. H. Robbins of the Ohio Coal Operators to Secretary of Labor Davis, declining the latter's invitation to a conference of operators and miners' representatives, cited *ibid.*, p. 320). In the 1943 coal strikes, because of the war situation strikes of even a few days were endangering war production, and the law of supply and demand was for once on the side of the miners. But this time wages were governed by the Little Steel Formula, over which the War Labor Board had no control. The miners' leader in 1927, as well as in 1943, was John L. Lewis.

[15] At a later point (Figs. 4 and 5) we shall find further evidence for this development.

[16] In the railroad industries this "demonstration" has become further reduced to a mere threat to strike: the "strike vote" of the unions and brotherhoods.

2. *Strike-duration profiles.*—The type of profile shown in Figure 2 is based on the Bureau of Labor Statistics' analysis of strike duration,[17] in which strikes are classified into a number of duration intervals.[18] For each such interval the number of workers involved and of man-days idle is given, together with the number of strikes, so that a mean idleness can be computed separately for each interval. Constructing the strike rectangles for successive intervals, one obtains for each year a "duration profile" showing with considerable faithfulness the distribution of the duration of idleness among all the workers involved. This faithfulness can be further increased by replacing the broken-line upper boundary by a smooth curve drawn so as to preserve the area in each interval, thereby giving expression to the fact that the workers in each interval were not all idle the same length of time.

Figure 2 shows three such duration profiles, selected for their characteristically different appearance. In each of these profiles we have also shown the total mean idleness (*T.M.I.*) for the year, that is, the height of the single rectangle whose area equals the sum of the areas of the several rectangles in the profile.[19] This figure, therefore, reveals the role of the total mean idleness as a measure of the actual strike idleness in each year. In the 1927 profile, with its abnormal preponderance of the very high rectangles, about 50 per cent of the workers involved were idle a much longer, and the other 50 per cent a much shorter, time than the 81 days' mean idleness.[20] In the 1937 profile the idleness of about 70 per cent of the workers involved was less, but naturally not greatly less, than the 15.8 days' mean idleness; and, of the remaining 30 per cent, only a small part shows a very much longer mean idleness. According to the 1942 profile, over 80 per cent of the workers were idle less, but of course very little less, than the 4.9 days' mean idleness, while only a very small fraction shows a much longer idleness.

All the other duration profiles for the United States show that between 65 to 75 per cent of the workers involved were idle a shorter time than the mean idleness. Where the mean idleness is only a few days long, it is, therefore, highly representative of the actual idleness. Where, on the other hand, the mean idleness is large, a more distinct picture is obtained by using two separate values —one for longer, and one for shorter, strikes.[21]

3. *Strike-result profiles.*—In Figure 3 is shown a type of profile which is obtained by classifying strikes according to their outcome.[22] The rectangles marked *A* represent strikes which ended with substantial gains for the workers;

[17] For the years 1927–36 from Bulletin No. 651 (1937), *Strikes in the United States, 1880–1936;* for the subsequent years from the annual strike reports in the May issues of the *Monthly Labor Review.*

[18] Until 1940 the Bureau of Labor Statistics used six duration intervals: strikes less than 1 week; 1 week to ½ month; ½–1 month; 1–2 months; 2–3 months; over 3 months. Since 1941, the better to reveal the preponderance of very short strikes, the first of these intervals has been broken into three: strikes of 1 day; of 2–3 days; of 4 days to a week.

[19] Another way of putting it is that the duration profile exceeds the total strike rectangle on the one side by as much area as it falls below it on the other.

[20] In this presentation the coal strikes of 1927 (see above, n. 14), separated from strikes of shorter duration, stand out more distinctly in their full height (138 days' mean idleness).

[21] If, e.g., one breaks the 1927 strikes into two classes—one of 20 days or less, the other over 20 days—one obtains a mean idleness of 8 days for the former class and of 118 days for the latter.

[22] Based on the annual Bureau of Labor Statistics' analyses of strike results, appearing in the May issues of the *Monthly Labor Review.*

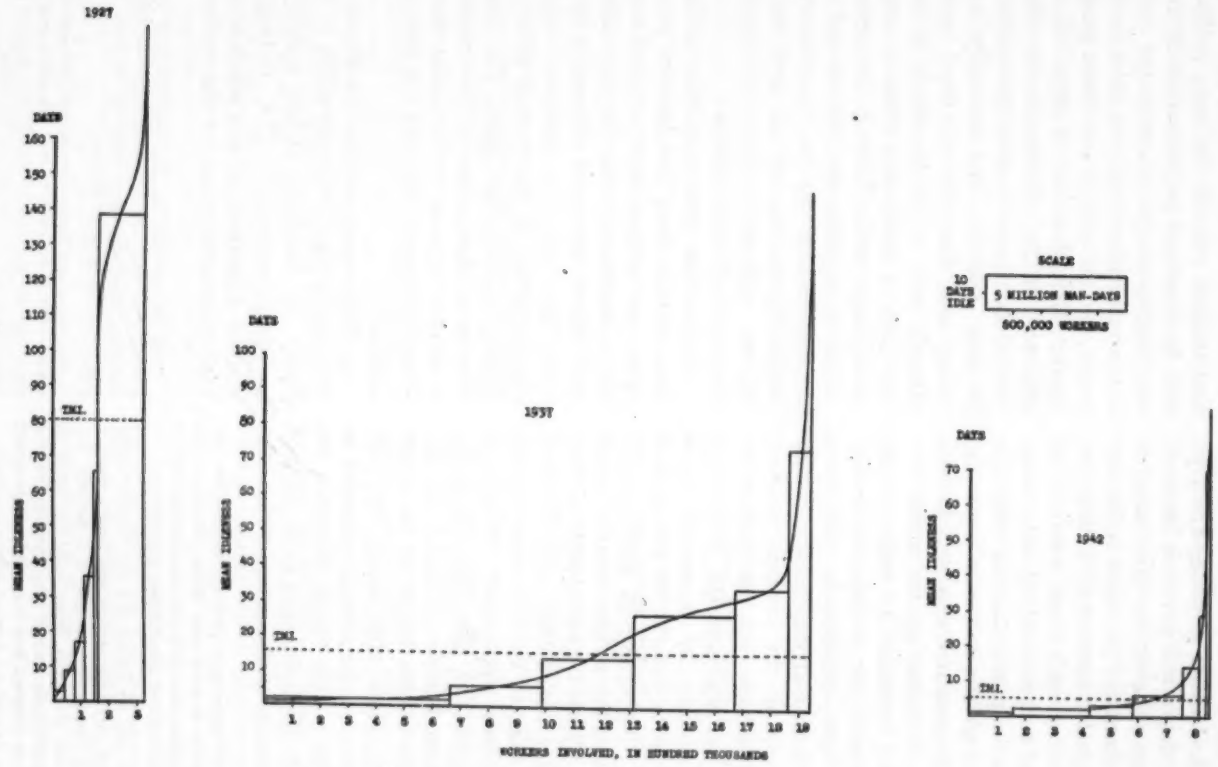


FIG. 2.—Selected strike-duration profiles, United States, 1927, 1937, 1942

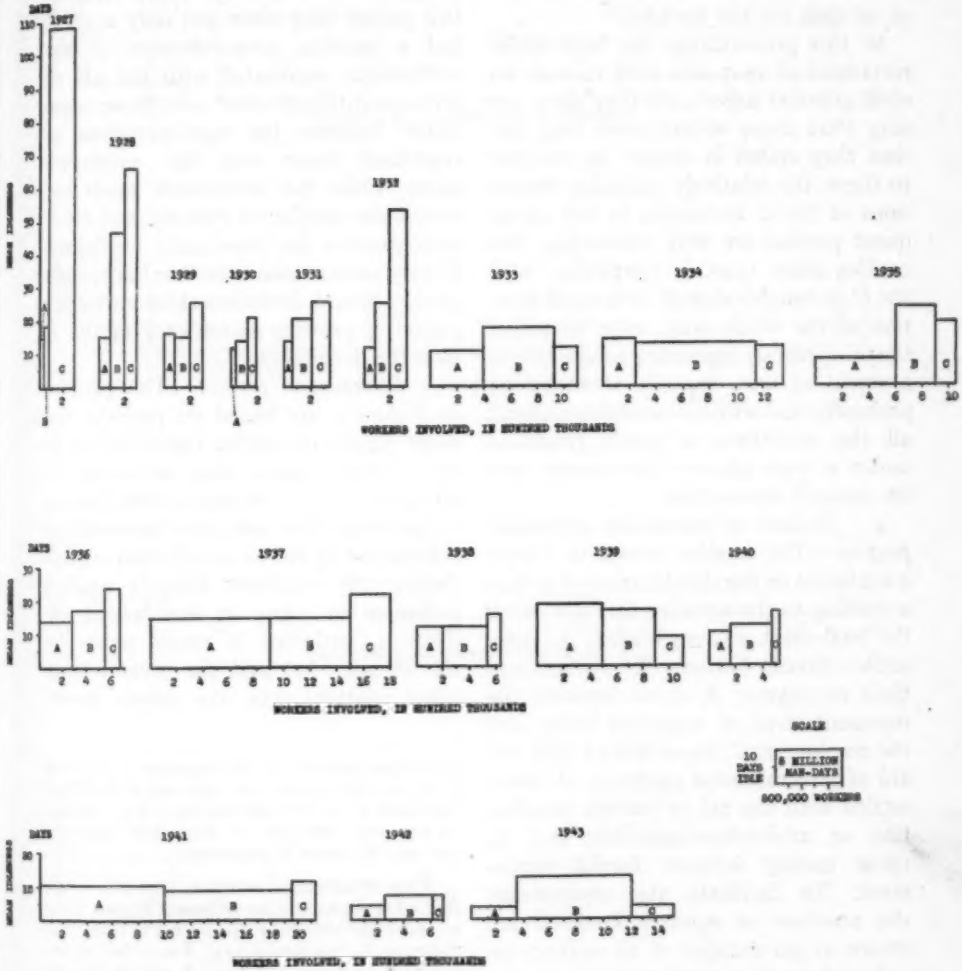


FIG. 3.—Strike-result profiles, United States, 1927–43

B, those ending with partial gain or compromise; *C*, those ending with little or no gain for the workers.[23]

In this presentation the high strike rectangles of 1927 and 1928 take on an even grimmer aspect, for they show not only that these strikes were long but that they ended in defeat. In contrast to these, the relatively declining dimensions of the *C* rectangles in the subsequent profiles are very noticeable. The profiles since 1940, in particular, with the *C* rectangles shrunk to a small fraction of the whole only, seem to reflect the prosperously expanding production in a world at war, capable of absorbing promptly, and without becoming glutted, all the multitude of goods produced under a vast plan—unfortunately one for mutual destruction.

4. *Methods-of-negotiating-settlements profiles.*—The profiles shown in Figure 4 are based on the classification of strikes according to the agencies through which the settlement was negotiated: *A*, those settled directly between the workers and their employers; *B*, those between the representatives of organized labor and the employers; *C*, those settled with the aid of governmental agencies; *D*, those settled with the aid of private conciliation or arbitration agencies; and *E*, those ending without formal settlement. To facilitate the comparison, the numbers of workers involved are shown as percentages of all workers involved in strikes during the particular year.[24]

[23] These are the classifications used by the Bureau of Labor Statistics. In addition, three further, minor classifications are given, not shown in the above profiles: jurisdictional disputes; indeterminate; and "not reported."

[24] Because of this percentage scale, the areas of the rectangles are not equal to, but only proportional to, the number of man-days idle. The factor of proportionality is $W/100$, where W is the total number of workers involved in the respective years; that is, a rectangle n per cent wide and k days high represents $n \cdot k \cdot W/100$ man-days. E.g., an area 10 per cent wide and 10 days high represents $10 \cdot 10 \cdot W/100 = W$ man-days.

The figures underlying these profiles are available only since 1937.[25] During this period they show not only a great but a growing preponderance of the settlements negotiated with the aid of governmental agencies[26] over those negotiated between the representatives of organized labor and the employers alone, while the settlements made between the employers directly and their own workers are practically negligible. If they were available further back, such profiles would doubtless show an earlier period of growing ascendancy of the *B* over the *A* rectangle.[27]

5. *Strike-issue profiles.*—The profiles in Figure 5 are based on perhaps the most significant strike classification in the United States, that according to strike issues. For the outstanding feature in American labor relations has been the role played by the issues of union organization: the stubborn struggle against unionism in many of the largest industries, outlawed in recent years by the Wagner Act and the several state labor relations acts; the unions' grow-

[25] The classification of strikes according to the method of negotiating the settlement appears in the annual strike analysis of the Bureau of Labor Statistics for the first time in 1935. But in the first two years the number of man-days idle are not given for the several classes.

[26] The principal ones among these governmental agencies are the U.S. Conciliation Service; the national and several state labor relations boards; various state mediation boards; and, of late most prominent, the War Labor Board.

[27] The fact that the *C* rectangle is, throughout, higher than the *B* rectangle has a very obvious reason: governmental agencies will take a hand only where the direct negotiations of the parties have failed.

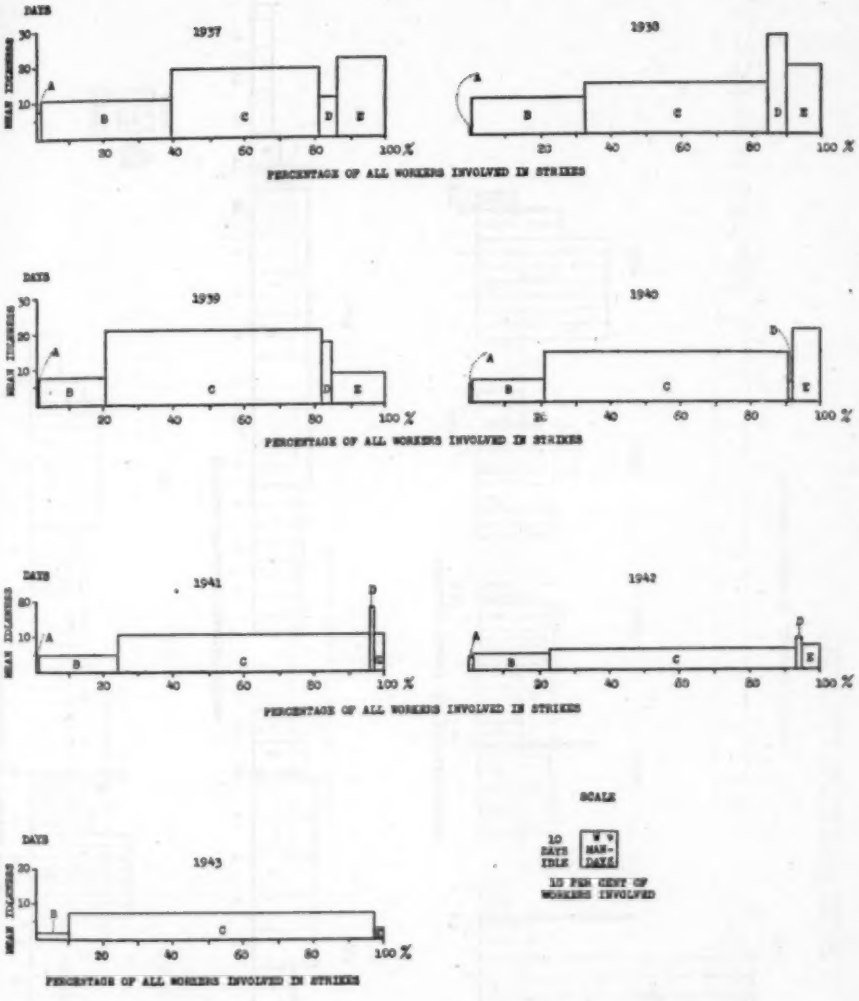


FIG. 4.—Methods-of-negotiating-settlements profiles, United States, 1937–43

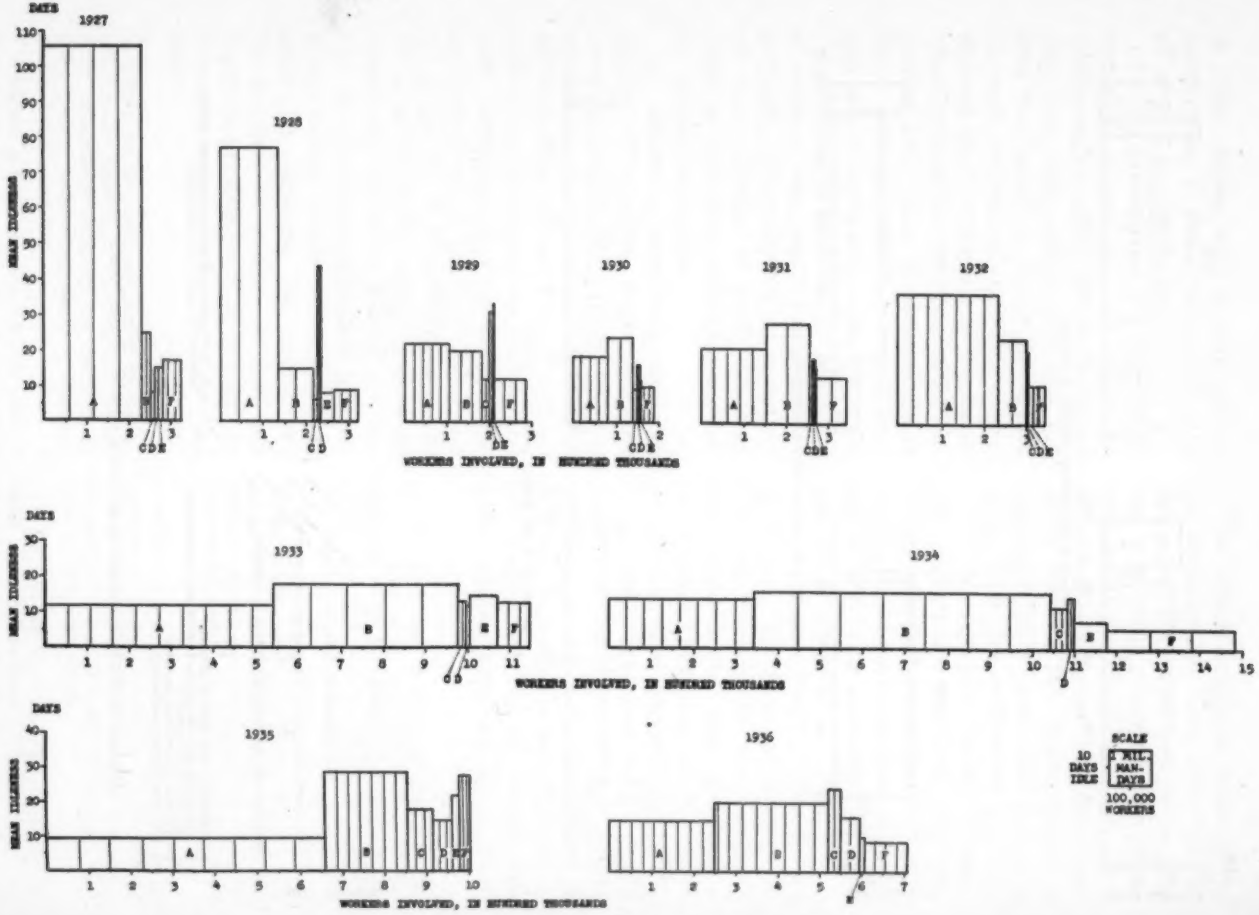


FIG. 5.—Strike-issue profiles, United States, 1927–43

FIG. 5.—Strike-issue profiles, United States, 1927–43

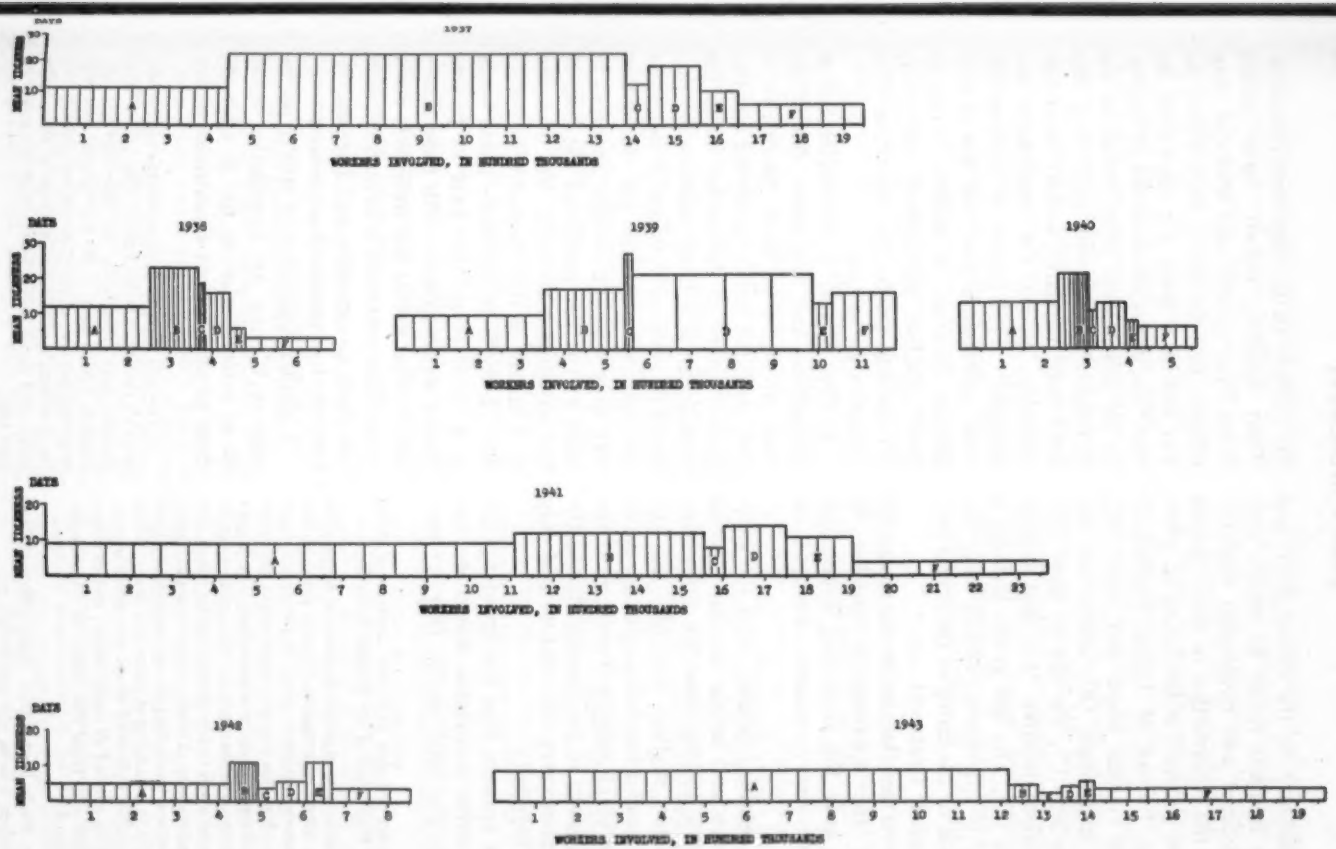


FIG. 5.—*Continued*

ing insistence on the closed shop; and labor's frequent resort to strikes over jurisdictional and rival-union disputes.

For the construction of these profiles we have grouped strike issues, as given by the Bureau of Labor Statistics,[28] into six classes: wages and hours (*A*), union recognition (*B*); anti-union discrimination (*C*); the closed shop (*D*); intra-union disputes (*E*); and miscellaneous (*F*). The last group includes a variety of grievances, usually over the dismissal or the hiring of particular persons, unfair treatment, etc.[29]

The vertical lines inside the rectangles signify the approximate number of strikes over the respective issues: one line for every nearest hundred of strikes.[30]

The resulting profiles, with the varying width and height of their several rectangles, looking now like a towering Manhattan skyline, now like the low silhouette of a battleship, give by themselves a vivid numerical account of the strike history of the country during the last sixteen years. We wish to add only a few comments.

a) It appears that the trend toward lower strike rectangles which we noticed in the total profile (Fig. 1) pertains chiefly to the wage-hour rectangles. Their heights, indeed, have melted down from months and weeks of mean idleness to only 10–12 days before the war and to a mere 5–7 days since the war. The organization-strike rectangles, on the other hand, have varied far less in height. In fact, ever since 1933 they have stood regularly, and at times considerably, above the wage-hour rectangles.[31] This seems to confirm the view expressed above that the over-all shorter duration of strikes is due to more effective adjustment machinery, private and public, in connection with collective bargaining.

b) The *B* and *C* rectangles (union recognition and anti-union discrimination) would be far more informative if they could be further analyzed into two parts—strikes in industries under the jurisdiction of a labor relations act (national or state) and strikes in industries not covered by such an act—for in that way only could it become apparent to what extent the continued big bulk of the recognition rectangle has been due to a failure of the Wagner acts ("Big" and "Little") to eliminate union issues as a cause of strikes—that is, to continued noncompliance with these acts—and to what extent the strife over union recognition continues in industries where the right to organize and bargain collectively has remained unprotected.

A similar separation of strikes on the basis of Wagner Act jurisdiction would be of interest also in the *E* class, to show to what extent rival-union strikes

[28] Bureau of Labor Statistics' analyses of strike issues, in May issues of the *Monthly Labor Review*.

[29] Classification of strikes by issues is not possible with any degree of precision, because many strikes concern several issues at once. In particular, wage and hour demands for new agreements are often linked with issues of union organization. The Bureau of Labor Statistics accounts for this overlapping by listing, in addition to the separate major issues, frequent combinations of issues: recognition and wages; closed shop and hours; etc. For our purposes we have disregarded this mingling of issues and have counted as organization strikes all those into which organization issues entered as major issues; and as wage-hour strikes only those into which no organization issues entered.

[30] Zero inside lines signify 1–50 strikes; 1 line, 51–150 strikes; 2 lines, 151–250 strikes; etc.

[31] The only exception appears in the 1943 profile, in which the organization strikes, with 4 days' mean idleness, have fallen below the wage-hour rectangle standing 9 days high. If the four general coal stoppages had not been counted as one (see above, n. 10), the *A* rectangle of this profile would be about twice wider, and hence twice lower—that is, about 4.5 days high.

occur where the dispute could have been adjudicated by a labor relations board.

c) The varying density of the inside lines indicating the approximate number of strikes is not without interest—in particular the fact that since 1938 the *B* (recognition) rectangle is regularly far more densely ruled than the *A* (wage-hour) rectangle, whereas earlier (notably in 1933, 1934, and 1937) the reverse is true. This seems to indicate that since the validation of the Wagner Act in 1937 the struggle over union recognition has, on the whole, continued in smaller units than the struggle over wages and hours.[32]

6. *Comparative strike profiles.*—Figure 6 shows a comparison of the total strike profile of the United States with those of several other countries: Great Britain, known for its mature trade-unionism; Canada, with its Industrial Dispute Investigation Act of long standing; Australia, the land of governmentally regulated working conditions; Sweden, sharing with Great Britain the reputation for best-functioning trade-unionism; and Norway, as a second Scandinavian country. To render the comparison significant, the numbers of workers involved are given as percentages of the total wage-earning population in the respective countries.[33]

The strike statistics of all these countries would permit tracing the profiles back to the beginning of the century and beyond.[34] To show them all in their full length would extend the graphs and prolong their discussion unduly. Hence, for Great Britain we begin with 1912, so as to obtain a view of the situation before and during the first World War. For the other countries we limit ourselves to the period since 1919.[35] To render the width of the United States' profile comparable to the others, we

[32] The exceptionally large, but sparsely ruled, *D* (closed shop) rectangle in the 1939 profile reflects the large strike of the United Mine Workers of America for the closed shop in the captive coal mines.

[33] For the United States the reduction, to percentages of all industrial wage-earners, of the number of workers involved is taken from the *Monthly Labor Review*, LVI (1943), 961, Table I. The totals for the wage-earning population on which they are based are exclusive of salaried employees, government workers, and other nonstriking classes of workers. For the other countries the reduction to percentages was made on the basis of figures for the total wage-earning populations published in the *I.L.O. Yearbook of Labor Statistics, 1940*, Table II. In the cases of Great Britain, Canada, and Australia, an estimated allowance of about 25 per cent of all wage-earners was made for salaried employees who were included in the figures as given. The figures thus obtained for the total wage-earning populations were 12,000,000 for Great Britain, 2,000,000 for Canada, 1,200,000 for Australia, 2,000,000 for Sweden, and 700,000 for Norway. (These figures refer to 1930 for Sweden and Norway, to 1931 for Great Britain and Canada, and to 1933 for Australia. Using them without change for a period of twenty years or more renders the percentages somewhat inaccurate; however, on the scale on which they are presented these inaccuracies do not noticeably affect the profiles.) Because of the percentage scale, the areas of the rectangles are not equal to, but only proportional to, the number of man-days lost. The factor of proportionality is $N/100$, where N is the total of the wage-earning population in the respective countries used in the reduction of the number of workers involved to percentages. A rectangle n per cent wide and k days high represents $n \cdot k \cdot N/100$ man-days idle; e.g., a rectangle 10 per cent wide and 10 days high represents $10 \cdot 10 \cdot N/100 = N$ man-days.

[34] The figures are to be found in the annual strike reports of the official publications of the several countries: the *Ministry of Labour Gazette* for Great Britain; the Department of Labour's *Labour Gazette* for Canada; the *Labour Reports of the Commonwealth Bureau of Census and Statistics* for Australia; *Sveriges officiella statistik, social statistik*, for Sweden, and *Statistik årbok for Norge* for Norway. For Sweden and Norway the latest figures that could be found were for 1938 and 1937, respectively, doubtless because of war conditions.

[35] In the case of Norway previous to 1921 the official report gives two sets of data: those reported by the employers and those reported by the unions. These are so contradictory that they could not be used for our purposes. Hence the profile is shown only from 1921 on.

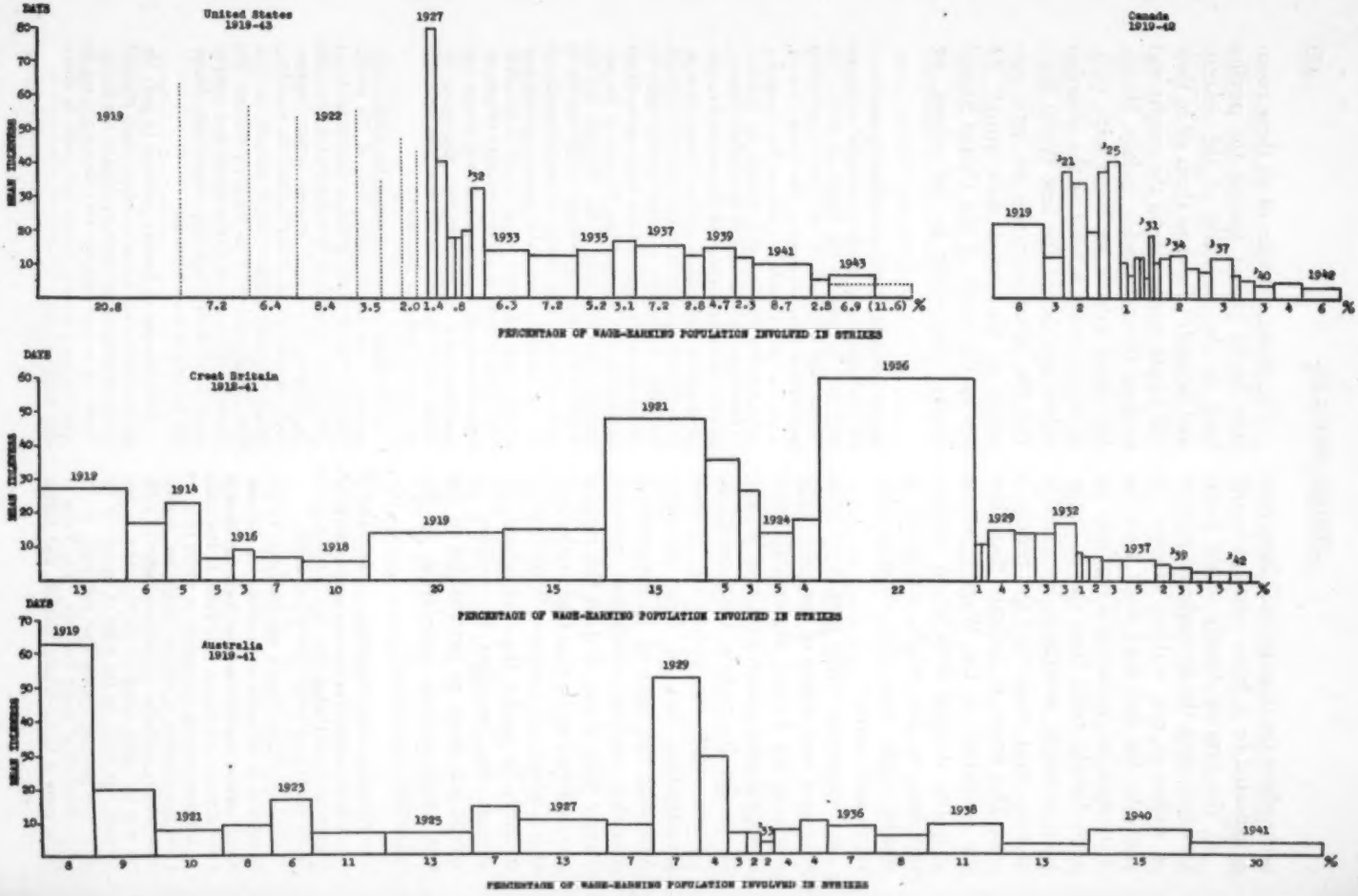
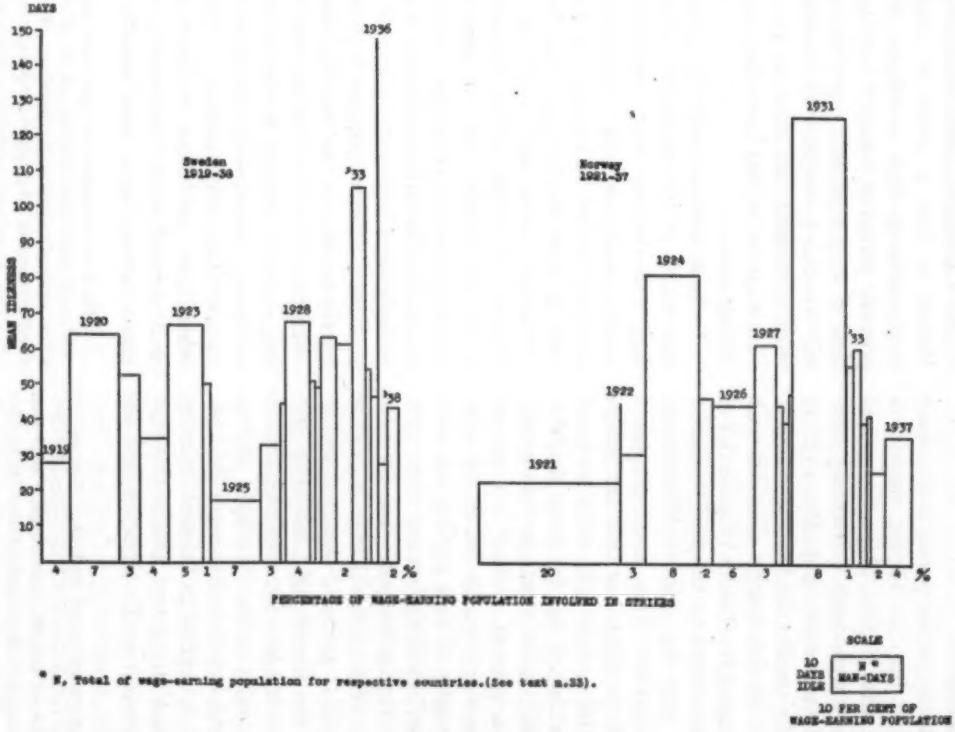


FIG. 6.—Comparative strike profiles



* N, Total of wage-earning population for respective countries.(See text n.33).

FIG. 6.—*Continued*

show the known number of workers involved since 1919, leaving the heights of the rectangles for the years until 1927 undetermined.

The British strike profile seems most remarkable for the abrupt change in pattern after 1926: huge, oversized rectangles are suddenly followed by comparatively moderate, and after 1932 by continually smaller and lower, rectangles. Inasmuch as this change coincides with the passage of the Trades Dispute Act of 1927,[36] one might be tempted to ascribe to this act the Alice-in-Wonderland transformation.[37] This, however, would hardly be justified. For that act forbids general strikes only; and, while the great width—although not the great height—of the giant 1926 rectangle was largely due to a general strike,[38] no general strikes were responsible for all the other big rectangles of that period; nor were general strikes likely to recur even without the Trades Dispute Act. A more adequate view of the change in pattern after 1926 is perhaps obtained by regarding the increasingly moderate rectangles of the late twenties and thirties as a reversion to the "normal" pattern after the severe disturbances of the postwar period, notably in the coal industry, had abated. Of interest, also, with a view to the present strike situation, are the wide but low wartime strike rectangles for 1917 and 1918, while those for 1940-42 are both low and narrow.

The Canadian profile resembles the British in that a series of relatively large, notably high rectangles in the postwar period is followed by a succession of very moderate ones, both as to width and as to height.[39] The recent wartime rectangles are seen to be again somewhat wider, but lower than the preceding ones.

In the Australian profile the great relative width of the rectangles is surprising,[40] considering that disputes over wages, hours, and other working conditions are settled by compulsory arbitration through the various wage boards, industrial courts, and industrial commissions and that strikes in such disputes are "illegal." On the other hand, the height of the rectangles, with a few exceptions, is rather uniformly low, especially since 1931.

A very different picture is presented by the profiles of the two Scandinavian countries, with their high, even towering, strike rectangles, telling the tale of stubborn, months-long industrial stoppages.[41] This seems strange in countries where labor conditions are known to be well ordered, with trade-unions recognized decades ago, with industry-wide

[36] For a summary and analysis of this act see *Ministry of Labour Gazette*, XXXV (1927), 286. Section I of the act declares strikes illegal if other than in furtherance of trades disputes within the trade or industry, or if designed to coerce the government directly, or by inflicting hardship on the community.

[37] Imagine that the United States strike profile had shown a similar abrupt shrinkage after 1935!

[38] The 1926 rectangle really consists of essentially two parts—two-fifths of the width very high, the other three-fifths quite low; the one showing the eight-month strike of about 1,000,000 coal-miners, the other the 10-day general strike of over 1,500,000 workers in sympathy with the coal-miners (*Ministry of Labour Gazette*, XXXV [1927], 168).

[39] The high rectangles for 1922, 1924, and 1925 reflect the same coal calamity as do the British strike rectangles during the twenties. (See *Labour Gazette*, annual strike analysis for the above years.)

[40] The Australian profile from 1919 to 1942, drawn on the same percentage scale, is about four times as wide as the Canadian one for the same period.

[41] The duration analysis of Swedish strikes and lockouts shows a pattern quite different from the American: only a very small percentage of the workers is involved in stoppages of less than 8 days; the great majority is usually idle between 30 and 90 days; while at times a high percentage is involved in stoppages of between 90 and 180 days (*Sverige officiella statistik*).

collective bargaining firmly established, and with an intelligently designed and well-functioning governmental machinery to aid in the adjusting of labor disputes.

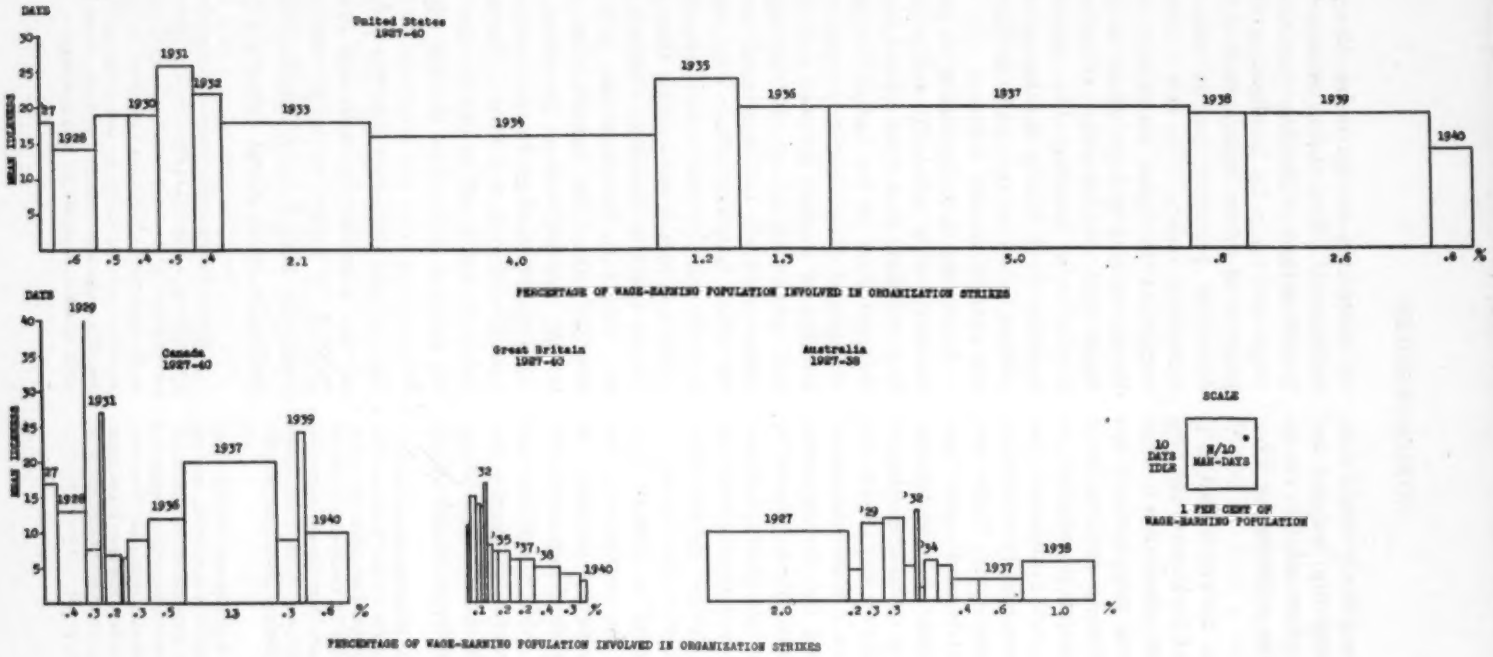
The paradoxical answer is that it is not in spite of, but because of, the high degree of industrial organization in these countries that work stoppages are apt to last so long. Workers and employers are not only completely organized in unions and employers' associations, but these, in turn, are strongly centralized in national confederations. Under this system strikes and lockouts, after having been decided upon with due deliberation by the national union or employers' association—usually by way of rejecting an award made by a state mediator—are, upon approval by the respective confederations, financially supported by the latters' ample war chests, accumulated for this very purpose from the regular and considerable contributions of all their members.[42] The burden of a months-long strike or lockout thus does not rest on the workers and employers in the particular industry but is borne by the whole of industry in the country.[43] With strike-breaking and strike violence, moreover, largely unknown, these stubborn industrial struggles are not the grievous social calamity which they are apt to be elsewhere in the world. Nevertheless, economically this method of deciding questions of wages and hours by months-long stoppages is, of course, highly wasteful and somewhat primitive for an orderly, democratic society. This fact is widely recognized in these countries,[44] and hence one may perhaps expect to find those high Scandinavian strike rectangles—now standing like towering monuments of Viking fighting spirit—melting down to reasonable heights in the none-too-distant future.

Among the strike profiles of all these countries with reputedly well-ordered labor relations, that of the United States does not show up too badly. The postwar period shows similarly large percentages of workers involved in strikes and great heights of the rectangles (where we begin to know them), as in the other countries. Since 1933, it is true, the American profile has been much wider and considerably higher than the British and the Canadian, although far less wide than the Australian and far less high than the Scandinavian. All in all, the impression, prevailing in many quarters, of an extraordinary extent of strikes in the United States is hardly justified and is perhaps due to the delusion of the large absolute numbers deriving from the great size of the country and drummed into the public ear day after day by radio and press. (Indeed, if drawn on equal absolute scales, the United States' profile would stretch in width about two-and-a-half

[42] On labor conditions in the Scandinavian countries, see P. H. Norgren, *The Swedish Collective Bargaining System* (Cambridge, Massachusetts, 1941); Marquis W. Childs, *This Is Democracy: Collective Bargaining in Scandinavia* (New Haven, 1938); Sigfrid Hansen, *Employers and Workers in Sweden* (Royal Swedish Commission, New York World's Fair, 1939).

[43] In the words of a prominent Swedish labor leader: "If the parties do not succeed in reaching positive results through negotiations they then rely upon the excellent harmony among the members and the organization's economic resources. Therefore they take the conflict equably, and after it has begun it often takes a long time to bring it to a conclusion again" (Hansen, *op. cit.*, p. 18).

[44] Norway has repeatedly resorted to compulsory arbitration as a way out of the industrial impasse. Laws to that effect were in force 1916–19 and 1927–29. In 1938 special legislation was passed to settle particular, pending strikes by compulsory arbitration. The same was done in Denmark, where the strike situation is similar, in 1936 and 1937.



* N, Total of wage-earning population for respective countries. (See text n.53).

FIG. 7.—Comparative organization-strike profiles

times the measure for Great Britain, fifteen times that for Canada and Sweden, twenty-five times that for Australia, and forty times that for Norway!)

Moreover, in making these comparisons it must be kept in mind that for the United States, in contrast to all the other countries, this period has been one of deep-stirring readjustment in labor relations: the belated and hence somewhat explosive growth of trade-unionism and collective bargaining, under the sponsorship and protection of the Wagner Act. Strikes in the United States, therefore, have still been fought, to a great extent, over the very principles of union organization which were largely settled in the other countries long before.

To show to what extent organization strikes in the United States exceed those in the other countries, we show in Figure 7 a comparison of the profiles for organization strikes alone. The Swedish profile is too small to be shown,[45] the British, quite diminutive.[46] Australia's organization strikes are not inconsiderable, and the Canadian profile shows something like an echo of the Wagner Act upheaval in the middle thirties. But the United States' organization-strike profile,[47] on the same percentage scale, is very large indeed.

It appears, therefore, that at this stage the greatest single improvement in the United States' strike situation would come through the eventual settlement of the issues of union organization.

WASHINGTON, D.C.

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[45] In 28 years of Swedish strikes (1911–38), the number of workers involved in organization strikes was less than 10 in 8 years; between 10 and 100 in 7 years; between 100 and 500 in 12 years; and somewhat over 1,000 only once, in 1920 (*Sverige officiella statistik*). The Norwegian strike reports do not analyze strikes by issues, most likely because strikes, as a matter of course, concern only wages, hours, and working conditions.

[46] The British strike analysis by issues does not give the man-days idle per issue. Hence the mean idleness for the strike totals of the respective years was used in the above profiles.

[47] Inclusive of strikes over union recognition, anti-union discrimination, the closed shop, and rival unionism.

GROWTH OF THE AMERICAN GLASS INDUSTRY TO 1880—*Continued**

WARREN C. SCOVILLE

VI. SOURCES OF FUEL AND MATERIALS; THEIR EFFECT UPON THE INDUSTRY'S LOCATION

THE availability of basic materials was another factor which affected the industry's development. Calculations based upon the census returns for 1860, 1870, and 1880 reveal that the cost of fuel and materials amounted to about one-third the value of all glass made;[136] and, although the evidence is not conclusive, the data found in the 1820 census suggest that materials accounted for something less than this percentage during the early part of the century. This may well have been true, because the supply of cheap wood around each furnace constantly dwindled and increasing numbers of shops turned to coal, which frequently had to be brought great distances.

The United States possessed most of the materials needed in such abundance that Jarves wrote around the middle of the century that "we can, in all the articles where the value of the materials predominates, compete successfully with importers of foreign glass."[137] The first entrepreneurs were handicapped, however, by the necessity of locating and developing domestic sources of supply. Fuel and potash were readily obtainable from the vast forests, but fire clay for pots and furnace bricks had to be imported from England, Holland, or Germany. American clay beds were first uncovered in New Jersey,[138] and, later, excellent deposits were found in western Pennsylvania and Missouri.[139] Since glassmakers did not know how to prepare domestic clay properly, it was not used very much until after 1860,[140] and foreign sources were still being tapped by some manufacturers as late as 1880.

Supplies of suitable sand also had to be located because that yielded by most rivers and shores contained too many impurities and particles of iron for use in making clear glass.[141] The first important sources were found in New Jersey and Delaware, and their output was shipped to New England and as far west as Pittsburgh. Near the middle of the century excellent deposits were being quarried at

* This is the final instalment of this article. The first instalment was published in the September, 1944, issue, pp. 193–216.

[136] For 1880 the proportion of material costs to value of output was 50 per cent for plate glass, 34 per cent for glassware (tableware, chiefly), 37 per cent for window glass, and 43 per cent for green glass (containers, chiefly). Hence, in those branches where labor costs loomed large, the expense of raw materials was relatively small (see first part of this article, this *Journal*, LII [1944], pp. 211–12, n. 100).

[137] *Reminiscences*, p. 93. Clark wrote that "American glass makers were peculiarly favored in respect to raw materials" (*op. cit.*, II, 498).

[138] The early Pittsburgh houses had to haul their supplies over the mountains in carts (Bining, *op. cit.*, p. 258; Gillinder, "American Glass Interests," pp. 275–76; Knittle, *op. cit.*, pp. 211, 308). As later discoveries proved, this was like "carrying coals to Newcastle."

[139] Knittle, *op. cit.*, p. 20; Gillinder, "American Glass Interests," p. 283. The clays of Maryland, Ohio, and Indiana were also usable (Weeks, *op. cit.*, p. 29).

[140] Weeks, *op. cit.*, pp. 39–40, 84; Bining, *op. cit.*, p. 258; Jarves, *Reminiscences*, p. 113. Eastern manufacturers, especially, continued to import their clay; but this may well have been due to cheaper transport costs.

[141] Nevertheless, the first houses appear to have used it (Knittle, *op. cit.*, p. 7).

Juniata (Pennsylvania) and in the Berkshires. Eventually the United States was able to provide the best and purest sand anywhere available from many different sources.[142] Domestic coal was plentiful and cheap in the western area, and shops along the Atlantic Coast could draw the quantities they needed by boat either from abroad or from the Cumberland region without too great a freight charge.[143] The Leblanc, and later the Solvay, process so cheapened soda that all glasshouses except those making flint ceased using potash almost altogether after 1850.[144] Throughout the period, therefore, the industry reaped substantial benefits from the increasing availability and improvements in the quality of materials.[145] Sand and clay, for example, were shipped to furnaces over shorter distances than in the early part of the century; and the construction of canals, turnpikes, and later railroads lowered inland freight rates per ton-mile on all goods.

Chart II portrays the price trends of materials used, along with index numbers for wholesale commodities and glassware. Material prices leaped more than twice as high as those for general commodities in 1813–14 because British naval action in Chesapeake and Delaware bays interfered with the shipment of Virginia coal to Philadelphia and because foreign coal prices in New York soared. From 1820 to 1844 the indices for items essential to glassmaking remained constantly higher than those for most goods sold at wholesale; thereafter, except for 1865 and 1866, the two series converged. Aside from the two periods of war and inflation, the long-run trend of basic material prices was definitely downward.

One of the most important influences which fuel and materials had upon glassmaking was evidenced in the locational pattern adopted by shops. Entrepreneurs had to weigh the advantages of being close to their materials against the savings which they could effect by locating near their own customers; and in the majority of cases they decided to construct their works near important sources of fuel. If this was impossible, they selected sites along navigable rivers and harbors in order to minimize transport charges for both materials and finished product.

Fuel dominated their considerations[146]

[142] E.g., in Berkshire County (Mass.), Juniata County (Pa.), Hancock County (W. Va.), Fox River (Ill.), and Crystal City (Mo.).

[143] As compared with western producers, however, those along the Atlantic were at a disadvantage which in large measure explains the relative decline of the industry in New England (see Henderson, *op. cit.*, XLII, 595; Lanier, *op. cit.*, p. 334; Weeks, *op. cit.*, p. 91).

[144] William Cooper, *The Crown Glass Cutter & Glazier's Manual* (Edinburgh, 1835), p. 115; Gaffield "Scraps," I, 125. Soda took a shorter time to fuse, was available in a purer state, and was actually cheaper than potash (Gaffield, "Glass Journal," I, 27; "Correspondence on Glass and Glass Making," I, 59; Macbeth-Evans Co., *op. cit.*, p. 54).

[145] As a result, manufacturers did not have to refine the various ingredients or frit the batch before melting; the amount of scum which rose to the surface in the pot diminished; and the glass increased in brilliance (see Weeks, *op. cit.*, p. 34; McKearin, *op. cit.*, p. 9).

[146] During the natural-gas boom in the North Central states following 1880, shops were hurriedly built near almost every well. Later, as many manufacturers were led by the dwindling supplies and increased price of natural gas in the area to turn to producer gas and petroleum, fuel was widely enough present to permit decentralization. The opening-up of new fields in the Southwest and Far West, improvements in facilities for piping or hauling gas and oil, and better producer-gas units all tended to lessen the dependency of the industry upon particular fuel-providing areas. In recent years, therefore, nearness to markets has become of increasing importance in deciding where to locate new plants.

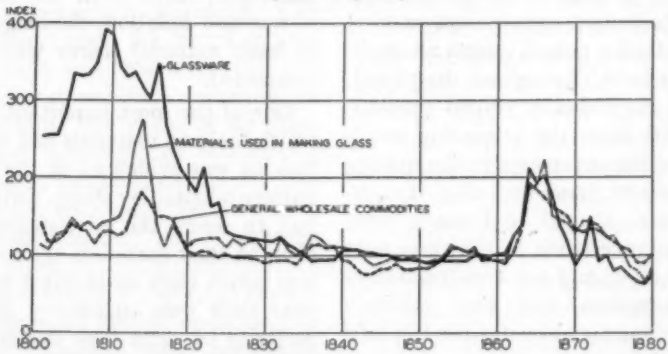
In this connection I have benefited a great deal from discussion with my colleague, Robert L. Bishop, who is studying certain aspects of the bottle industry.

because practically all of its great weight was lost in combustion. Manufacturers could escape, therefore, most of the freight costs occasioned by coal or wood if they located near ample sources of supply. Batch lost only about 20 per cent of its weight during melting;[147] be shipped from its source to the consumer market (either as silica or as glass) in any case. Some producers, nevertheless, justified the location they chose for their plant by indicating the proximity of excellent sand beds. Fortunately for a few who took this erroneous view,[149]

CHART II

PRICES OF GLASSWARE, MATERIALS USED IN MAKING GLASS, AND GENERAL WHOLESALE COMMODITIES*

(Base = 1856–60)



* The wholesale commodity indices are Warren and Pearson's (*op. cit.*, pp. 25–26), and it was not necessary to change them in any way because they averaged 100 for the base years used here.

The commodities used in the materials series are: potash at Philadelphia (1801–60), potash at New York (1801–60), Virginia coal at Philadelphia (1801–60), foreign coal at New York (1801–60), and anthracite at New York (1826–60) (Arthur H. Cole, *Wholesale Commodity Prices in the United States, 1700–1861* [Cambridge, Mass., 1938], "Statistical Supplement"); red lead at Philadelphia (1801–61) (Anne Bezanson, Robert D. Gray, and Miriam Hussey, *Wholesale Prices in Philadelphia, 1784–1861* [Philadelphia, 1937], Part II, p. 121); anthracite pea (1843–80), anthracite stove (1840–80), bituminous (1857–80), Rockland lime (1840–80), and soda ash (1840–80) (Aldrich Report, II, 176, 177, 178–79, 226–27, 261–62). The weighting occasioned by using two series of potash prices (1801–60), three of coal (for most years), and one of each of the other materials gives about the same result that selected weights would have yielded. Furthermore, red lead figured less in production costs after 1865 than before because of the increasing popularity of lime glass; and manufacturers also shifted from potash to soda ash about the same time.

The commodities used in the glassware series are: window glass in New York (1801–61) (taken from work sheets prepared by Warren and Pearson and borrowed from Dr. Cole's files at the Harvard Business School); window glass at Philadelphia (1801–61) (Bezanson, Gray, and Hussey, *op. cit.*, Part II, p. 87); window glass at New Orleans (1805–64) (taken from work sheets prepared by George R. Taylor and borrowed from Dr. Cole's files); window glass at New York (1825–63) (Carl H. Juergens, "Movement of Wholesale Prices in New York City, 1825–1863," *Quarterly Publications of the American Statistical Association*, XII [1910–11], 544); polished but unsilvered plate glass (1857–80), third-grade window glass (1852–80), first-grade window glass (1840–80), bowls (1860–80), goblets (1860–80), pitchers (1860–80), and glassware sets (1860–80) (Aldrich Report, II, 233, 241, 242, 276–78). Unfortunately all of the series before 1857 are for window glass.

hence, no matter whether glass was made near sand beds or near its own markets, most of the expenses involved in shipping sand, alkali, or lime could not be avoided.[148] Sand, for example, would have to

real economies were realized because the plant actually had a centralized position in regard to market areas.[150]

Most wood-burning furnaces were built near forests and, like sawmills, fol-

[147] Gaffield, "Scraps," I, 125.

[148] If the price of fuel were the same in every part of the country, the furnaces would have been built near major glass markets, because the freight rates per ton-mile upon such packaged goods as glass were higher than upon such bulky items as sand.

[149] E.g., the plate-glassworks at Crystal City, Mo.

[150] It should be noted that the area east of the Mississippi River and north of the Mason-Dixon line not only provided most of the materials for glass (especially fuel) but also constituted the best market because of its relatively dense population.

lowed receding timber lines. The great advantage of Pittsburgh unquestionably lay in her excellent coal deposits; and throughout the century there was a marked tendency for the industry to shift to this and other coal-mining regions.[151] Table 2 suggests the extent of this westward trek. The data for 1820, 1840, and 1860 are not thoroughly reliable because the census returns were incomplete and probably inaccurate; yet they are helpful in indicating trends and proportions. The greatest change seems to have occurred between 1860 and 1880, when glassmaking declined sharply in the New England states and increased both absolutely and relatively in the western area.[152]

VII. DEMAND FOR AND PRICE OF GLASSWARE

The growth of most industries reflects changes in the demand for their products, and glassmaking was no exception. During the first years of the nineteenth century Americans needed windowpanes for their houses more than any other kind of glassware; therefore, the major portion of the output was sheet or crown. Later on, fine grades of flint glass found a ready market, and bottles were produced in increasing quantities to supply druggists, concocters of patent medicines, distillers, brewers, and household food packers. The demand for plate glass did not become sufficiently great to warrant domestic production on a large scale until the latter half of the century.[153]

Glass panes were exceedingly rare in houses built during the seventeenth century. At first they were small, diamond-shaped pieces which were fitted into casement windows with lead. After 1700 the double-hung frame grew in popularity, and windows came to be regarded from an architectural as well as from a purely utilitarian standpoint. The swing-out variety, patterned after the French and sometimes reaching the floor, was held in great esteem in the 1850's, but the ordinary two-sash window remained the most common. Regardless of the type of frame employed, there was a persistent tendency to use larger and larger panes.[154] A shop in New Hampshire around 1814, for example, finding that its 8″×10″ squares were larger than the public wanted, had to discontinue this size.[155] Thirty years later in the Boston area twelve panes of 11″×16″ or 12″×18″ were commonly used in each window; then the sash with three long lights (e.g., 26″×10″) made its appearance, only to be superseded in new constructions by two-light sashes. Gaffield remarked that in 1867 only a few people had yet installed sashes with single panes (which measured from 30″×30″ to 42″×40″).[156] Eventually this single-light sash became the most prevalent.

[151] Depletion of local wood supplies was one of the most important reasons for the failure of shops before 1860.

[152] In 1880 Pennsylvania made about 44 per cent of all window glass, and New Jersey was a poor second with her 14 per cent; Pennsylvania also accounted for 51 per cent of all flint and lime glassware, while New York, which was second, made only about 12 per cent; New Jersey led all states in green glass (30 per cent) but was closely followed by Pennsylvania (29 per cent). The output of Allegheny County (the Pittsburgh area) alone, furthermore, was 65 per cent of all kinds of glass made in Pennsylvania and about 27 per cent of that produced in all states. The second-ranking county (Philadelphia) accounted for only 7.67 per cent of the United States's output (Weeks, *op. cit.*, pp. 9–11).

[153] Clark mentions the "existence of an almost unlimited market for it" in the Middle and Far West during the 1880–93 prosperity (*op. cit.*, II, 502).

[154] This was the chief reason why sheet or cylinder glass finally displaced crown altogether (see first part of this article, this *Journal*, LII [1944], 202).

[155] Leonard H. Burbank, "The Keene Glass Works," *Antiques*, IX, 312.

[156] "Notes on Glass," IV, 151 ff.

TABLE 2*

LOCATION OF AMERICAN GLASSHOUSES, 1820–80

STATES	NUMBER OF ESTABLISHMENTS								VALUE OF ANNUAL OUTPUT					
	1820		1840		1860		1880		1840		1860		1880	
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	Output†	% of Total	Output	% of Total	Output	% of Total
New England (total)	8	24	11	13	15	17	13	6.0	$ 628,000	21	$2,094,576	25.0	$ 1,084,345	5.0
Connecticut	2	6	2	2	2	2	1	0.5	32,000	1	58,000	0.7	160,000	0.5
Massachusetts	4	12	4	5	11	13	11	5.0	471,000	16	2,004,500	24.0	854,345	4.0
New Hampshire	2	6	3	4	2	2	1	0.5	70,000‡	2	32,076	0.3	70,000	0.3
Vermont	.....	.....	2	2	.....	.....	.....	.....	55,000	2	.....	.....	.....	.....
Middle Atlantic (total)	14	42	38	47	43	49	76	36.0	1,411,071	48	3,452,186	40.0	7,315,925	35.0
Eastern Pennsylvania	2	6	2	2	10	12	17	8.0	95,000‡	3	1,167,000	13.0	2,084,959	10.0
New Jersey	5	15	23	28	16	18	27	13.0	904,700	31	1,098,000	13.0	2,810,170	13.0
New York	7	21	13	16	17	19	32	15.0	411,371	14	1,187,186	14.0	2,420,796	12.0
South Atlantic (total)	2	6	1	1	.....	.....	9	4.0	40,000	1	.....	.....	587,000	3.0
Maryland	2	6	1	1	.....	.....	8	4.0	40,000	1	.....	.....	587,000	3.0
District of Columbia	.....	.....	.....	.....	.....	.....	1	0.5	.....	.....	.....	.....	.....	.....
West (total)	9	27	31	38	30	33	113	54.0	866,222	30	2,954,543	35.0	12,168,301	57.0
Illinois	.....	.....	.....	.....	.....	.....	7	3.0	.....	.....	.....	.....	901,343	4.0
Indiana	.....	.....	.....	.....	.....	.....	4	2.0	.....	.....	.....	.....	790,781	4.0
Kentucky	.....	.....	.....	.....	1	.....	5	2.0	.....	.....	65,000	1.0	388,405	2.0
Missouri	.....	.....	.....	.....	2	2	6	3.0	.....	.....	282,000	3.0	919,827	4.0
Ohio	3	9	.....	.....	4	5	20	9.0	.....	.....	91,400	1.0	1,549,320	7.0
Western Pennsylvania	5	15	26	32	21	24	61	30.0	702,400	24	2,296,143	27.0	6,636,625	31.0
West Virginia	1	3	4	5	2	2	4	2.0	156,500	5	220,000	3.0	748,500	4.0
All others	.....	.....	1	1	.....	.....	6	3.0	7,322	1	.....	.....	233,500	1.0
Total for all areas	33	99	81	99	88	99	211§	100.0	$2,945,293	100	$8,501,305	100.0	$21,155,571‖	100.0

* Sources: *Fourth, Sixth, Eighth,* and *Tenth Census.* Percentage figures have been calculated only roughly.

† Includes the output of glass-cutting establishments, although the number of establishments listed is for glassworks only.

‡ Includes one interpolated value for a shop which did not report its output.

§ Only 169 of these, however, actually made glass in 1880; 42 were idle or being built.

‖ Naturally, this total includes the output of only those shops which were active.

Some of the wealthiest people in Boston had begun to use polished plate instead of sheet glass in their front windows before 1850, and thereafter this practice spread. More and more city stores used plate glass for display purposes, and the ordinary size of each pane increased from 26″×16″ to 84″×60″ during 1840–70.[157]

Bottles and flasks, like windowpanes, enjoyed a ready market throughout the century. At first, they were used chiefly for whiskey and other spirits, but the patent-medicine industry soon began to require large quantities also. The preservation of foodstuffs by housewives (to whom the advent of the Mason screw-top jar in 1858 was a boon) increased the demand still more. Glass containers, however, were not used by commercial food packers to any great extent before 1880.

The tableware division probably reflected changes in consumers' buying habits more than any other branch of the industry. Until 1864 flint, and thereafter lime, glass was blown or pressed into all sorts of items for household use, and beautiful designs were cut or etched by acid on many pieces. If one shop developed a pattern which met with popular approval, others immediately duplicated it. After the Civil War complete sets of tableware were fashioned in the same pattern, and colored glass returned to favor. Since pressing and the improvement in lime glass had placed tableware within the reach of the masses, its market in 1880 was many times larger than a half-century earlier.

One major division in the flint-glass branch arose in response to technological changes outside the industry. This was the manufacture of chimneys for oil lamps. Although a few chimneys had been blown and shaped by hand earlier, the discovery of petroleum and the perfection of the kerosene lamp shortly before the Civil War eventually led to a tremendous increase in the demand. The peak in production occurred in the decade following 1890, when the annual output averaged about 22,500 tons and actually reached 26,554 tons in 1899.[158] Meanwhile, the price per dozen for chimneys had fallen from $1.75 in 1854 (and $2.25 in 1864) to as low as 30 cents in 1888.[159]

Since the amount of all kinds of glass taken off the market in any one year depended partly upon selling price, it would be interesting to know whether items other than lamp chimneys also became cheaper as industrial output expanded. Bottles appear to have declined in price by about two-thirds from 1804 to 1832; flint-glass tumblers by something like three-fifths; and common glassware by one-half.[160] Pressed lime tumblers in 1877 were bringing only 19 cents per dozen in the East, whereas in 1808 those blown of flint glass around Pittsburgh had sold for $2.00 per dozen.[161] These scant data, admittedly, are unsatisfactory for tracing price trends for the entire period. Fortunately, it was possible to construct simple index numbers from a few continuous price series compiled by others, and these are shown

[157] *Ibid.*, IV, 153–54. Gaffield concluded that these two trends resulted in a great increase in the demand for polished plate.

[158] *Report to the Annual Meeting of the American Association of Flint and Lime Glass Manufacturers* (1901).

[159] Davis, *op. cit.*, p. 238, n. 2.

[160] *Ibid.*, p. 122; Dyott, *op. cit.*, p. 53; Gaffield, "Glass Making," Vol. III: "Report on Glass Manufacturing in 1832"; Harry Hall White, "Early Pittsburgh Glass Houses," *Antiques*, X, 366; Knittle, *op. cit.*, pp. 214, 314.

[161] Knittle, *op. cit.*, p. 314; Gaffield, "Glass Journal," III, 174; *National Glass Budget*, Vol. XXIV (Pittsburgh), February 27, 1909.

‡ Includes one incorporated value for a shop which did not report its output.
§ Only 169 of these, however, actually made glass in 1880; 42 were idle or being built.
|| Naturally, this total includes the output of only those shops which were active.

in Chart II. Until 1857 window-glass prices in several different places alone were available; consequently, the indices at best give only the probable trend of prices for all kinds of glass prior to the Civil War. That the long-run trend was markedly downward, however, is not open to serious question.

The domestic market was widened not only by the relative decline in the price of glass compared with most other commodities but also by the growth of population, the rising standard of living, and a remarkable improvement in transportation facilities. During the eighteenth century most shops had to sell their output in neighboring regions unless they were happily located along natural water routes. In fact, the high cost of carting windowpanes and bottles over the Alleghenies in 1796–1800 was one reason why furnaces were constructed around Pittsburgh at that time. By 1832, however, both eastern and western shops were selling their products from Maine to New Orleans. First canals and later railroads drastically reduced inland freight costs.[162] A hundredweight of glass shipped between Pittsburgh and Philadelphia, for example, had to pay about $10 in 1800; after the state's canal system was completed, the cost fell to around $1.25. By 1853, owing to the competition of railroads, it had declined to 40 or 50 cents.[163]

VIII. GOVERNMENT POLICY, WARS, AND DEPRESSIONS

Government agencies did not participate *directly* in the development of glassmaking to any great extent after 1800. During the eighteenth century, however, Colonial and state legislatures had encouraged various entrepreneurs by permitting them to raise money through lotteries, extending them loans with or without interest, exempting their capital from taxation for a limited time (usually five years), and waiving obligations of military and jury service for their employees. Less frequently, shops had been accorded exclusive production privileges;[164] and Massachusetts seems to have been the only state to give employers bounties on production.[165] Shortly after 1800 nearly all these encouragements were discontinued, and glassmakers could only hope at the very most to obtain exemption from local taxation and military service.[166]

In 1790 Congress refused the request of John Frederick Amelung for a substantial loan so that he could continue making glass in Maryland;[167] and throughout the nineteenth century, as in other industries, the federal government followed such precedents. It did, however, encourage domestic production by subjecting glass imports to very high

[162] The rate per ton-mile between the Atlantic Coast and the interior for most goods fell by six-sevenths or seven-eighths from before the completion of the Erie Canal to 1850–60 (Clark, *op. cit.*, I, 350).

[163] Bining, *op. cit.*, p. 267.

[164] E.g., Massachusetts granted such privileges to a group of men in 1752 and to another in 1783, 1787, and 1793 (Gaffield, "Glass Journal," III, 212–14; "Notes on Glass," V, 78–79; Jarves, *Reminiscences*, p. 56; Gillinder, "American Glass Interests," p. 276; Knittle, *op. cit.*, pp. 105, 181); Connecticut did likewise in 1747, 1779, and 1782 (*ibid.*, p. 192; Gaffield, "Scraps," I, 147).

[165] By the act passed on June 15, 1793, the Boston Crown Glass Company was to receive 6*d.* per crown (for the first 10,000 made in any year) for three years (Gaffield, "Notes on Glass," V, 79).

[166] *Ibid.*, V, 88–89, 99–100. It is interesting to note that many decades later, when natural gas was discovered throughout the old Northwest Territory, local communities vied with one another in offering factory sites and free or cheap gas to those who would build furnaces in their neighborhood.

[167] Gaffield, "Scraps," II, 166; Knittle, *op. cit.*, pp. 172 ff.; McKearin, *op. cit.*, p. 103.

duties.[168] Partly as a result of the tariff, American shops were able to supply around four-fifths of all glass bought in the United States from 1831 to 1880 as compared with less than three-fifths before 1820.

Wars and depressions, as was typical of industry in general, influenced glassmaking greatly. From the Embargo of 1807 until the end of the war with England in 1814 the number of glasshouses multiplied. Fourteen were incorporated in New York State alone, and production in the Pittsburgh area almost quadrupled in value from 1810 to 1815. At least 44 glass furnaces were lighted throughout the country for the first time in 1808-14.[169] This growth was mainly attributable to a marked decrease in glass imports as shown in Table 3. The annual imports are given as percentages of the average number of black quart bottles and square feet of window glass bought from foreigners each year in 1806–8. The effects of the Nonintercourse Act (March, 1809) and of the war were most pronounced; and an increase in tariff duties occasioned the decline after 1816.

[168] Pearce Davis, in his intensive study of the relation of the industry to the tariff, found that the rates on most kinds of glass increased from 10 to around 23 per cent between 1789 and 1812 and that, like other duties, they were doubled when war broke out. In 1816–24 they were lowered almost to their pre-war level, but from 1824 to 1832 they were raised to between 50 and 100 per cent. The Compromise Tariff of 1833 provided that the rates be gradually lowered to around 20 per cent by 1842, when they were again increased to such an extent that most specific duties amounted to over 100 per cent of the value of glass. Congress lowered them along with other duties in 1846 and 1857 to an average of 30 and 24 per cent, respectively. During the Civil War and until 1872 they varied from 30 to 65 per cent, depending upon the kind of glass; in 1872 slight revisions downward were effected (*op. cit., passim*).

[169] Davis, *op. cit.*, p. 14; Gaffield, "Notes on Glass," V, 98; McKearin, *op. cit.*, p. 133.

The end of the war brought a flood of imports which, together with the crisis of 1819, was responsible for acute distress. It has been estimated that at least half of the glasshouses built in 1808–15 failed during the first five years of peace following the Treaty of Ghent;[170] and around Pittsburgh the number of men employed in the industry fell by 76 per cent and the value of their output by 85 per cent.[171] Most of the entrepreneurs who submitted returns for the 1820 census made such statements as "business dull" and "supply overrunning demand in consequence of large foreign importations." During the recovery following 1820–21 and until 1837, glassmaking prospered. At least 64 new works were established. The crisis, which brought an end to this expansion, witnessed the complete failure of some 20 or 30 shops and a temporary suspension of activity on the part of many more.

The industry grew steadily during the 1840's and 1850's despite the lowered

TABLE 3*

IMPORTS OF BLACK QUART BOTTLES AND WINDOW GLASS, 1806–20

(Percentages of the Average for 1806–8)

Year	Bottles (Per Cent)	Window Glass (Per Cent)	Year	Bottles (Per Cent)	Window Glass (Per Cent)
1806–8	100	100	1815	5	9
1809	15	15	1816	220	79
1810	39	93	1817	100	51
1811	119	102	1818	114	50
1812	18	26	1819	78	44
1813	20	22	1820	55	22
1814	11	10			

* Based upon figures given by Davis, "The American Glass Industry and the Tariff" (doctoral dissertation, Harvard University, April 1, 1938), pp. 55, 59.

[170] McKearin, *op. cit.*, p. 133.

[171] Davis, *op. cit.*, p. 16, n. 3; see also, Bining, *op. cit.*, pp. 261–62.

tariffs of 1846 and 1857; not even the distress of 1857 interfered very much. Additional expansion was fostered by the Civil War and the depreciation of the greenback because they enabled Americans to improve their position in both domestic and foreign markets.[172] Glassmaking was unscathed by the conflict because it was almost entirely centralized in northern and western areas which escaped the ravages of war. The number of plants at work near Pittsburgh was 40 per cent greater in 1865 than eight years earlier, and output increased elsewhere. The cessation of hostilities and the crisis of 1873 occasioned only temporary setbacks. In 1880 there were almost twice as many factories making glass as there had been in 1860, and the value of their combined output was 2.4 times greater.

IX. BUSINESS ORGANIZATION, EXTENT OF COMPETITION, AND ENTREPRENEURSHIP

In spite of crises and other vicissitudes, therefore, the glass industry grew in stature. Between 1820 and 1880 the number of active shops increased fivefold, the number of workmen employed twenty-five fold, the physical annual product about seventy fold, and the amount of capital invested almost one hundred and seventy fold.[173] The present essay thus far has suggested several factors which contributed to this growth. Among the more general ones were the increasing wealth and population of the country as a whole, improvements in transportation, and the discovery of abundant raw materials of good quality. High import duties, the Embargo of 1807 and nonintercourse, the war with England in 1812, and the Civil War with its exchange depreciation tended to reserve the expanding domestic market for American producers. Such major technological changes as side-lever pressing, lime glass, and improvements in furnace construction resulted in lowered production costs and increased consumption. The shift from small wood furnaces to larger and more costly ones fired with coal, the increased investment in expensive molds and pressing machinery, the construction of more permanent factories, and the building of several plate-glass plants with their heavy outlay in equipment, all aid in accounting for the seven fold increase from 1820 to 1880 in the amount of capital employed per worker.

There were also a number of handicaps which help to explain why the industry did not grow at a faster rate and why its small-scale character remained essentially unchanged. A shortage of labor with sufficient skill and technical knowledge, the accompanying high wage scales, and the reluctance of glassworkers to adopt new methods of production exercised a retardative influence upon the expansion of individual shops. High tariffs tended to maintain the status quo. By reducing foreign competition, they prolonged the life of many inefficient firms and re-

[172] Until 1860 glass imports had been from five to ten times greater than exports. In 1862–65 they were only 7 per cent more, and in 1863 exports actually surpassed imports.

[173] The 1820 census, upon which this statement is based in part, does not give complete returns for even those shops listed. Davis' estimates for the numbers employed and the amount of glass made in this year (*op. cit.*, pp. 65, 106) have been used, and the capital for three shops has been interpolated.

The *value* of the annual output increased only twenty-seven fold from 1820 to 1880, but the price of glassware declined by 62 per cent (see Chart II, above). The ratio of wholesale commodity prices in 1820 and in 1880 suggests that the real value of capital invested increased one hundred and eighty fold.

moved an important incentive to industrial and technological improvement.[174] Few innovations made before 1880 were of a revolutionary character, and most of the technical processes did not necessitate production on a large scale.[175] With some justification it could perhaps be argued that the industry had already improved its handicraft methods as much as possible; and, until the big hurdle of adapting the processes to machine principles had been cleared, little further advance could be expected.[176]

In 1880 glassmaking was approaching the threshold of a technological revolution. The basic features of precision machinery were known, tank furnaces were available, and temperature control—so important in working glass—was heightened by the substitution of gaseous for solid fuel. When inventors then learned how to devise machines which could handle metal in the same manner as skilled blowers, epoch-making advances occurred. Before this happened it was reasonable only to expect most producers to make the best of what had already been accomplished. One of the arguments advanced in this paper, however, is that the majority of American manufacturers in 1880 actually were behind the times in matters of technology. Especially after 1860 their shops were equipped with less efficient furnaces and used older processes than those in England, Belgium, and Germany. This state of affairs was due to a complexity of factors, but among the more important were those relating to business organization, extent of competititon, and entrepreneurship.

Nearly all the companies organized in the United States before 1800 had been simple proprietorships or partnerships, and these two forms of business organization remained popular for the next hundred years. New York was the first state to pass a general incorporation law on March 22, 1811, and her example was followed by most northern and western states between 1816 and 1860. Partly as a result of these acts[177] and the new impulse given manufacturing by the embargo, nonintercourse, and war in 1807–14, there was a marked increase in the number of glasshouses which sought corporate charters. Fifteen were incorporated in New York between 1805 and 1814 and six in Massachusetts in 1812–18.[178] Thereafter, fewer petitions were filed, and some were turned down. The owner of extensive bottleworks near Philadelphia unsuccessfully sought per-

[174] This point is effectively made by Davis (*op. cit., passim*). He concludes that the development of pressing and lime glass—America's main contributions to glass technology before 1880—occurred in spite of protection.

[175] Operation upon a larger scale than was then common would have required only a duplication of the production unit and would not have added many economies from a greater division of labor or from a fuller utilization of available equipment. In order to justify expansion, therefore, entrepreneurs had to weigh the advantages to be derived from buying materials and selling glassware in greater quantities against market limitations as expressed by an insufficiently elastic demand for their own output.

[176] For technological reasons glass has to be formed as soon as it is made and before it cools. This means that all stages from the mixing of batch to the annealing of finished products are intricately interrelated; therefore, drastic improvement in either melting or forming operations would strain production continuity. For metals and most things made with fire the situation is different. After metals are smelted and refined, they can be converted into finished goods at a later time and at another place.

[177] "At first there was a disposition on the part of company promoters to pass by the general statute in order to procure charters by special acts" (Clark, *op. cit.*, I, 266).

[178] Gaffield, "Notes on Glass," V, 80–81, 98. Between 1809 and 1815 at least 22 glass enterprises were incorporated in the United States (Davis, *op. cit.*, p. 15).

mission to incorporate in 1834,[179] and a year earlier the New York senate committee and legislature had refused a similar request advanced by other promoters on the grounds that the amount of capital required for the proposed factory was not too great for a single proprietor or partnership to raise.

With only a few exceptions (like the New England Glass Company) most corporations in the industry merely cloaked the operations of one or two individuals. No elaborate corporate organization or specialization of functions was developed, and the number of stockholders in most firms remained quite small.[180] The majority of glassmakers who incorporated before 1880 must have been motivated not so much by a wish to raise large amounts of capital as by a desire to escape unlimited personal liability in case of business failure.[181]

No matter what form their organization took, a great many companies were very short-lived. A furnace built at Lancaster, New York, in 1849, for example, was operated under five different firm names within thirty-two years.[182] The Saxon Sheet Glass Company in Boston began work in 1865 only to fail within six months. It was reorganized and failed again in as short a time; a third group of men, kindling its furnace once more, admitted defeat a few weeks later.[183] The numerous but small shops in New Jersey were constantly failing and passing into new hands; one in Bridgeton was reorganized six times between 1836 and 1880.[184]

One reason why bankruptcies were so frequent was the failure to adopt some reliable system of accounting. If books were kept at all, entries were not faithfully made nor was any one procedure followed throughout. Some of the books were more like diaries than business records,[185] and usually no allowance was made for depreciation and other capital charges. The individual or family who ran the shop as a proprietorship or partnership either was too careless or probably saw no reason for carefully calculating profits and losses. Even most incorporated firms had to render an account of their affairs only to small groups of

[179] This was "Dr." Thomas Dyott, who was convicted in 1838 of fraudulent insolvency in connection with the operations of his Manual Labor Bank in Philadelphia (Stephen Van Rensselaer, *Early American Bottles and Flasks* [rev. ed.; Peterborough, N.H., 1926], p. 162; Knittle, *op. cit.*, p. 149). Evidently the real reason for Dyott's attempt to incorporate the glass factory was his desire to disentangle this from his banking enterprise and not the altruistic reasons he advanced in several open letters appended to his book (*op. cit.*, pp. 55 ff.). Pennsylvania was one of the last industrial states to pass a general statute for incorporation (Clark, *op. cit.*, I, 267).

[180] The advantage offered by the corporation in raising large amounts of capital, however, was utilized by the plate-glass factories built in the 1870's.

[181] The Massachusetts law did not limit the liabilities of stockholders in manufacturing corporations until February 23, 1830, and then each one was severally responsible for all debts until the whole amount of capital stock had been paid in (Commonwealth of Massachusetts, "Act Defining the General Powers and Duties of Manufacturing Corporations," passed on February 23, 1830, and printed in full in the "Act of Incorporation of the New England Glass Company" [Boston, 1842], found in Gaffield, "Glass Making," Vol. VI). British commissioners to the New York Exposition in 1854 were impressed by the advantages which Americans derived from the low cost of incorporation and the limited liability enjoyed by stockholders (Clark, *op. cit.*, I, 266-67).

[182] Harry Hall White, "The Lancaster Glass Works," *Antiques*, XII, 300.

[183] Gaffield, "Glass Journal," II, 90, 110, 113, 114, 120, 121; Lanier, *op. cit.*, p. 334.

[184] I. T. Nichols, *The City of Bridgeton, New Jersey* (Philadelphia, 1889), p. 24.

[185] See, e.g., those of "Baron" Stiegel preserved by the Pennsylvania Historical Society and those of O'Hara and Craig in the library of the Historical Society of Western Pennsylvania.

stockholders who were often employees as well. Such corporations as the New England Glass Company and the Boston and Sandwich Glass Company, with relatively numerous shareholders drawn from the business world and with their complete set of accounting papers, were exceptions rather than the rule. After the Civil War noticeable improvement was made in bookkeeping methods, and many more firms kept adequate records than formerly.[186]

Very few fortunes were made in glass before 1860. An annual profit of $1,000 in bottlemaking afforded evidence of success;[187] and a leading window-glass manufacturer of New Jersey[188] stated in 1865 that substantial profits had never been made in glass. Those who were well off, he continued, had made their fortunes through investments outside the industry. According to Deming Jarves, who was himself a successful manufacturer, of the 42 concerns which made flint glass in the Atlantic states before 1852, 28 were complete failures, 10 were still operating, and 4 had ceased activity. The owners of only 2 of the 4 had been fortunate enough to have "retired with property."[189] The Sandwich and the New England companies were perhaps the most profitable of the longer-lived firms. The former was able to pay yearly dividends averaging about 6 per cent from 1825 to 1888; and the latter, from 8 to 20 per cent for most years between 1837 and 1873.[190] In addition, each company had reinvested from $300,000 to $400,000 of its earnings in plant and equipment.

The desire to widen profit margins did not result in horizontal or vertical expansions to any great extent before 1880. The founders of the New England Glass Company incorporated the New England Crown Glass Company in 1824 and the New England Bottle Glass Company in 1826; but this was unusual. About the only area where several manufacturers appear to have operated more than one plant was in and around Pittsburgh. At least five firms there in 1857 each owned three or more glasshouses.[191] Neither was there a persistent tendency to expand operations vertically.[192] Coal and basic materials[193] were usually purchased from outsiders, and by 1880 small companies were buying their molds from others.[194] The largest tableware factories, however, still maintained mold-

[186] As late as 1916, however, the U.S. Department of Commerce found that 109 out of 213 glass establishments submitting reports made no allowance for depreciation charges (*The Glass Industry: A Report on the Cost of Production of Glass in the United States* ["Miscellaneous Series," No. 60 (Washington, 1917)], p. 44). Robert L. Bishop called this reference to my attention.

[187] Knittle, *op. cit.*, pp. 356–58. Samuel Slater, in 1831, reported that most cotton manufacturers made very small profits after deducting interest on their investments and their own wages (Clark, *op. cit.*, I, 372).

[188] John B. Hay of the Winslow (N.J.) Glass Company (Gaffield, "Glass Journal," II, 83). Gaffield remarked in about the same year that "window glassmakers have a poor chance of success or money making in our country."

[189] *Reminiscences*, p. 65.

[190] Gaffield, "Glass Journal," II, 265; Lee, *op. cit.*, p. 57; *National Glass Budget*, Vol. XXVIII, December 12, 1912.

[191] Thurston, *op. cit.*, p. 142. Twenty-five years later 59 companies operated the 75 factories in the region (Gaffield, "Scraps," II, 196).

[192] Soon after the New England Glass Company began its successful career in flint glass, it decided to make its own red lead, part of which was also sold to other manufacturers.

[193] Occasionally a glasshouse would own its own sand pits.

[194] Knittle, *op. cit.*, pp. 32–33. There were five metal-mold works at Pittsburgh in 1860 with a combined capital of $250,000 and with a total of 334 male employees (*ibid.*, p. 35).

shops, and nearly all insisted upon making their own melting pots.[195]

Since there were no monopolistic "giants" or combinations but only large numbers of separate firms in all branches save plate glass, there was much competition.[196] Practical glassmen were constantly entering the industry because the amount of capital required for building and operating bottle, window-glass, and small tableware plants was not prohibitive. Manufacturers along the Atlantic Coast who faced high fuel costs increasingly complained that producers in western coal regions were ruining them, and everywhere the steady increase in the number of furnaces was decried. The improvement in lime glass increased competition in tableware to such an extent that flint-glass factories either failed or had to cease using lead in their batch.[197] Furthermore, charges of "selling below cost" were frequently hurled back and forth. Since most glassmakers did not use an adequate cost-accounting system and ordinarily overlooked all capital charges, such claims may not have been unwarranted. At any rate, the least capable entrepreneurs were continually being weeded out. Another significant result of this domestic competition, especially after the Civil War, was a tendency toward specialization in production. Firms increasingly limited their output to a particular line, such as containers, window glass, or tableware; and some factories even began to develop certain types of bottles and jars as their main interest.

Foreign competition also was keen. After the War of 1812 manufacturers in England were accused of dumping all kinds of glassware in the United States in an attempt to ruin the many new shops set up following the Embargo of 1807, and the British government continued until 1845 to subsidize its nationals with bounties on all exports of flint glass. Even had there been no dumping, most American producers could not have met the prices of imported ware because production costs in all except the pressed-glass field[198] were much greater in America than abroad. Overseas freight charges and losses due to breakage in transit were not sufficient to compensate for this disadvantage. For example, only 1 light out of 864 pieces of plate glass imported by a Boston firm from Birmingham, England, in 1863 was broken; and European houses were able to ship their products to America in returning grain and cotton freighters at only nominal freight rates. A Belgian told Gaffield in 1862 that he knew of one manufacturer who actually had been paid 50 cents per ton by a skipper for the privilege of carrying a cargo of glass to New York so that his ship would not have to buy ballast, only to bear the expense of getting rid of it upon arrival.[199] Following the Civil War the practice of dumping unpacked bottles as ballast into the holds of vessels returning to the United States spread.[200]

High tariff barriers eventually afforded American producers substantial protection from foreigners,[201] but they still had to contend with stiff competition

[195] Weeks remarked in 1883 that "this opposition to outside pot-makers is not so great as it was a few years since" (*op. cit.*, p. 40).

[196] As is usually the case in industry, competition was not "perfect," and no firm could have sold unlimited quantities of glass simply by lowering its own prices below those of other producers.

[197] This, together with the relatively high cost of fuel in Massachusetts, was primarily responsible for the failure of the New England and the Sandwich companies in the 1880's.

[198] It is significant that nearly all the glass exported before 1880 was pressed ware.

[199] Gaffield, "Glass Journal," I, 115.

[200] The American tariff was amended in 1883 to counteract this (Clark, *op. cit.*, II, 499).

[201] See above, pp. 346–47.

among themselves. As a result, window-glass manufacturers offered little organized opposition to the unionization of their workmen, and they later found in the strong labor union an effective means for controlling total output.[202] Earlier, in 1860–65, several of them along the Atlantic Coast had met at least once each year to set selling prices, fix wages, and agree upon discounts and packaging costs;[203] but, since no permanent organization was effected, these first attempts to limit competition were not very successful. Around 1875 the owners of window-glass factories west of the Alleghenies got together and formed an organization, which on July 9–10, 1879, gave way to the American Window Glass Manufacturers' Association. This included both eastern and western producers and set out to control competition, curb overproduction, and maintain profits. For more than twenty years following 1880 it and the workers' union completely dominated the window-glass branch. Flint-glass manufacturers also had met a few times during the Civil War;[204] but the National Flint and Lime Glass Association was not formed until May, 1880, when the western association (dating from 1874) and the eastern association (from 1879) merged. A strong Chimney Manufacturers' Association was also organized in 1880. Hence combinations of employers strong enough to control domestic competition in their respective fields were not influential factors in the industry's expansion until after 1880.[205]

In conclusion, the extent to which producers themselves conditioned the development of glassmaking should be considered. The personal element in the economic or industrial equation is hard to evaluate because it is so elusive and not subject to easy generalization. The entrepreneur lends himself to the abstraction demanded by much of today's economic theory less readily than do labor, capital, and natural resources.[206] His thought processes and most of his actions are not deterministic, because his functions are essentially those of a human being and not of any mechanistic object. It is dangerous, therefore, to postulate that the entrepreneur always, or even most of the time, acts rationally from a purely economic standpoint. This means that his behavior is never truly predictable or entirely understandable in the way "scientific" phenomena are. Nonetheless, he plays a significant role in the evolution of most industries, and some attempt must be made to describe his character and background.

During the eighteenth and the first part of the nineteenth centuries many persons in America who had never had any experience in glassmaking attempted to build furnaces and to direct the

[202] Davis, *op. cit.*, p. 181.

[203] Gaffield, "Glass Journal," I, 84 ff., 217, 222–23, 263; II, 75, 83, 87; "Prices Current of Window Glass," *passim*. The largest number of firms represented at any one meeting was eighteen on December 1, 1863.

[204] Gaffield, "Glass Journal," I, 284–85; II, 27–28; "Prices Current of Window Glass," p. 99. Twenty-eight separate firms signed an agreement in 1864 to discontinue the sale of goods on time, to make all prices net cash, and to make their customers pay the national excise.

[205] No producers' association comparable to that in window glass was ever developed in the green-glass (container) field (Davis, *op. cit.*, p. 212).

[206] "The philosophical problem of [entrepreneurial] action is that of freedom, especially rational freedom. A little reflection should make it clear why this topic has been so controversial. As far as scientific thinking is concerned, there can be no 'theory' of such activity, and it must be treated as residual, as what transcends interpretation in positive-scientific terms" (Frank H. Knight, "Profits and Entrepreneurial Functions," *The Tasks of Economic History*, a supplemental issue of the *Journal of Economic History*, December, 1942, p. 130).

activities of skilled blowers.[207] Several people, with abundant civic pride, frequently got together and built glassworks, only to fail immediately because of inadequate capital or a lack of knowledge.[208] Dissatisfied workmen, who had quit one shop, found little difficulty in organizing co-operative ventures among themselves or in fomenting promotional schemes among other groups, because glassmaking itself was a fascinating business and because prospective profits could be made to appear very large on paper.[209] In a new country, and especially in a new industry, it was to be expected that most of the first entrepreneurs would be unfamiliar with the technical and organizational requirements for financial success. Later, as glassmaking became more widespread, executive ability was developed within the industry.[210]

At times this bordered on inbreeding and created an unhealthy state, for glassmakers in all countries seem to have had a strong tendency[211] to become slaves of their craft and its techniques. Various compositions of different kinds of glass long remained cherished secrets which were handed down from father to son;[212] consequently, natural improvement through industrial "give-and-take" was limited. Men who had grown up in the industry during the first half of the nineteenth century were inclined to make conservative or even reactionary business heads during the second half.[213] Several firms, moreover, became family affairs, with each succeeding generation loath to depart from the way of its predecessor. Only a few seem to have encouraged experimentation,[214] and those in the table-

[207] Only a few examples can be given here. Caspar Wistar was originally a manufacturer of brass buttons; Thomas Dyott concocted patent medicines; "Baron" Stiegel owned iron furnaces; General O'Hara provisioned the army under contract; Albert Gallatin's background caused him to be appointed secretary of the United States Treasury under Jefferson; John Mather made powder; and Edmund Monroe was a Boston banker.

[208] Burbank, *op. cit.*, p. 312; Julia D. Sophronia Snow, "The Franklin Glass Factory—Warwick's Venture," *Antiques*, XII, 134; Knittle, *op. cit.*, pp. 168–70, 196–97, 240, 242–43, 383; Edwin Atlee Barber, *American Glassware, Old and New* (Philadelphia, 1900), pp. 55–59.

[209] Three different workers estimated for Gaffield, who formed the Boston Crystal Glass Company in the 1860's, that the annual profit one could expect from a window-glass plant during a fifty-week year would be $100,000, $109,000, or $136,850 (Gaffield, "Glass Journal," II, 136, 138–39, 147–48; Lanier, *op. cit.*, p. 317). Gaffield, nonetheless, discovered that in 1865–66 his shop sustained a net operating loss of $123,689, to which would have to be added a substantial capital loss in case the buildings and tools (valued at $170,000) could not be sold ("Glass Journal," II, 139–40).

[210] Likewise, capital for new shops (see Bining, *op. cit.*, p. 259).

[211] It may well be argued that this tendency was common in most crafts.

[212] See Gaffield, "Correspondence on Glass and Glass Making," I, 49; "Glass Journal," I, 48–49. A glassmaker at Millville, N.J., wrote in the *Scientific American* (August 21, 1865): "The principal reason why matters pertaining to the [glass] art are not more publicly discussed, I presume, is the desire to keep the formula secret. This, I believe, is the principal reason why so few real improvements occur . . . ." (Gaffield, "Scraps," I, 17). Today, by physical and chemical analysis, the components (and their proportions) of any piece of glass can be readily ascertained.

[213] See Jarves, *Reminiscences*, p. 64. A lack of entrepreneurial aggressiveness, generally, was an important factor in impeding technological and industrial growth. Of course, there were exceptions; and among the outstanding leaders must be ranked Deming Jarves, James B. Lyon, the Leightons, the Bakewells and Pages, Christian Dorflinger, the Gillinders, and many others. At least Jarves and Lyon, among the most aggressive, had not grown up in the industry. All of these men, moreover, were engaged in making tableware, and this was the division which made the most creditable showing of any in the industry before 1880.

[214] Deming Jarves, for example, secured the services of a certain Rice Harris from England around 1838 and paid him $5,000 to come over for six months and teach his workmen at Sandwich how to make opalescent glass (Chipman, *op. cit.*, p. 120; Lee, *op. cit.*, p. 123; *National Glass Budget*, Vol. XXVIII, December 7, 1912). He also encouraged those employees who played around with mixtures and colors with liberal rewards for achievement. With his approval, two men set up and operated miniature furnaces in the basements of their homes

ware division competed more actively with one another in trying to develop or duplicate popular glass patterns than they did in trying to improve technology by hiring chemists or technicians.[215] Most shops, it is true, did not have sufficient resources to finance research or promote innovation, even if their owners had so desired.

Fortunately, after 1865, entrepreneurial talent from without once again began slowly to infiltrate the old ranks, and this time it often proved a quickening influence.[216] The greatest problem confronting the industry during its formative period had been the acquisition of technical information. Practical glassmen familiar with European practices, therefore, had been needed to build, staff, and direct the early shops. After 1820, as men skilled in production methods became increasingly available as workers and foremen, aggressive business ability supplanted an intimate knowledge of basic techniques as the primary prerequisite of a successful manufacturer.[217] Several co-operative ventures undertaken by skilled workmen collapsed from poor business ability as much as from inadequate financial backing;[218] and failures were frequent among shops set up and financed by individual glassmen who had become prosperous while in another's employ. The belief that only an entrepreneur who had had practical experience as a glassmaker could be successful, nonetheless, prevailed. This in part deterred many outsiders from entering the industry, where profits were low and the fire hazard great. American capital had too many opportunities for remunerative investment in other fields to be attracted by glassmaking before mechanization enhanced its profitableness in the twentieth century.[219]

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for purposes of such experimentation (Lee, *op. cit.*, pp. 34–35; Chipman, *op. cit.*, p. 53). The other owners of the Boston and Sandwich Glass Company, however, seem to have resented these activities and considered them wasteful. Accordingly, in 1858, Jarves withdrew and organized the Cape Cod Glass Company (cf. Lee, *op. cit.*, pp. 48 ff.).

[215] Many employed professional designers. Gaffield stated that "the educated designer is the man who is always in demand about a factory, for by the results of his lucubrations are the factories maintained" ("Scraps," III, 5).

[216] Captain John B. Ford is an outstanding example. Successively and successfully saddle- and harness-maker, drygoods and grocery merchant, flour-miller, maker of flour cabinets for household kitchens and of feed-cutting boxes for farmers, iron manufacturer, shipbuilder, and operator of river steamboats, Ford became interested in a bottle factory in 1865 and soon thereafter, when he was fifty-six years of age, began to build his first plate-glass plant at New Albany, Ind. This he had to sell in 1872, but he built other works at Louisville, Ky., and at Jeffersonville, Ind. When he was sixty-nine, he was practically penniless; but with a fresh start made possible by one or two successful real-estate deals, he founded the Creighton, Pa., plate-glass factory in 1880. Later the Pittsburgh Plate Glass Company was organized to take over this highly successful plant, and Ford helped build two branch factories at Tarentum and Ford City.

Unquestionably, Ford, through his perseverance and entrepreneurial enthusiasm, was largely responsible for the successful establishment of the American plate-glass industry. When he was eighty years of age and worth well over a million dollars, he started the Michigan Alkali Company at Wyandotte (see Pound, *op. cit.*, *passim*).

[217] The organization and supervision of the work around the furnace still required an intimate knowledge of glassmaking processes, but a foreman or plant manager could be hired for this purpose. During the greater part of the nineteenth century there was little reason other than the small scale upon which most plants operated for burdening the entrepreneur with shop management; yet this was the common practice.

[218] Gaffield, "Scraps," I, 7; Jarves, *Reminiscences*, pp. 60 ff.; Knittle, *op. cit.*, pp. 300–303, 372, 373–74. Some co-operative organizations prospered, but in such cases one or two of the men usually bought out the others within a few years (Knittle, *op. cit.*, pp. 325–26; Gaffield, "Scraps," II, 118, 156; Macbeth-Evans Company, *op. cit.*, pp. 30–31).

[219] In this connection it is significant that most of the capital and entrepreneurs entering the industry from the outside in 1870–1900 were drawn to the plate-glass division, where capital counted for more in the production process than skilled labor.

ON DEBT POLICY

HENRY C. SIMONS

I HAVE never seen any sense in an elaborate structure of federal debt. The national government must, of course, provide and regulate the currency—a task it has never faced. It may perhaps, on some occasions, properly borrow money; i.e., open-market operations are a convenient, traditional, and perhaps desirable temporizing means of currency regulation.

On the other hand, it is essentially improper and undemocratic (Schachtian) to confuse issues by proposing and using a miscellany of debt forms. In wartime and in peacetime we should issue currency and (or) bonds. We should never disguise currency as bonds or conversely. Moreover, every issue of bonds should be primarily an announcement of prospective tax increases. (The converse here is not valid, since debt retirement may and should proceed secularly, at least if bonds are outstanding in excess of the amounts necessary to facilitate open-market measures.) Bond issues are properly a means for checking incipient inflation and are, like currency issue, a means especially well suited for prompt action by administrative rather than by legislative action.

Bonds, as the antithesis of money, here denote consols or perpetuities, i.e., obligations without *either* maturities or "call" features. In the good financial society bondholders could liquidate only by open-market sales; the Treasury could sell only one interest-bearing debt form and only by open-market sale; and it could retire such debt only by paying the current, free-market price. (There would, of course, be no bonds save those of the Treasury or, at least, no trading of private debts on organized exchanges; but sane government finance obviously need not wait for sane reform in private corporate finance.)

There is little hope for sound monetary-fiscal policy under representative government if our representatives persist in confusing everybody, including especially themselves, by issuing moneys, practically moneys, and near-moneys under other names. Trying to steer a path between phobias about paper money and terror of high interest costs, they create only fiscal bedlam and intolerable monetary uncertainty.

The community is now almost persuaded, on Treasury authority, that it can, with the same dollars, buy ammunition to make things hot now for Germans and refrigerators to keep things cool later on at home. Economists may be less credulous; but their relevant persuasions cannot be said to have escaped the confusion which bad fiscal practice invites. It is indeed difficult for anyone to think quite straight about equipment-trust certificates issued to pay either for war materials or for food distributed to the unemployed.

The issues here come to focus upon the problem of interest rates. Should the Treasury offer better interest terms to its lenders now? What interest rates should be offered after the war, when and if we clean up an awful mess of debt by consolidations and refundings. If wartime borrowing, like wartime (non)taxation, is beyond repair for the duration, postwar financial measures cannot yet be dismissed as unalterably determined wrongly by momentum or political habit. Neither may one concede the impotence of academic opinion or the certainty that its influence will again be predominantly wrong at the crucial time.

One merit of these strictures about debt form is that, if sound or if provisionally accepted, they largely answer our interest problem by indirection. Borrowing or refunding via consols must mean higher interest rates; we must pay people something to give up the liquidity features of their near-moneys. If we won't pay taxes to stop inflation, we must at least pay interest!

It should not be inferred, however, that the devices proposed will necessarily increase the interest burden, real or nominal. Confining bond issues to consols, we must pay higher rates, to be sure; but we need not pay higher rates on so large a debt. Retiring short-term and redeemable issues, we may then safely have more debt in a noninterest-bearing form; indeed, we should certainly need more money to prevent deflation if we dispensed with moneys disguised as bonds. Indeed, there is even less sense in the Treasury's paying interest on demand or time deposits than in permitting banks to do so (whether in cash or in kind).

Come at in this way, the postwar problem (if not war finance!) becomes readily intelligible and discussible. Our federal debt should be refunded promptly and totally into currency and consols. In other words, we should remedy as rapidly as possible our wartime mistakes as to debt forms. (Our sins of omission taxation-wise cannot, unfortunately, be corrected so easily, if at all. Inflation will prove largely irreversible—although much may be said for stabilizing the indexes rather than the realities, i.e., for deflating back to where the indexes tell the truth instead of revising the indexes so that they promptly cease lying when peace comes.) Some people evidently think that, having done everything wrong during the war, we should or must go on doing it all wrong afterward. I find little use for the hypothesis that error becomes truth merely by long or consistent practice.

This leaves the question of how much near-money should be converted into real, honest money and how much into consols. The answer is simple in principle and amenable to determination by experiment. It is only a matter of implementing monetary stabilization, i.e., of doing what is necessary to stabilize some sensitive and reliable price index. The major variable, namely, private investment, is largely an independent variable for fiscal or monetary policy—assuming that thrift is not undermined by extreme inflation and internal disorder. Investment is largely a matter of the fundamental security of property, including security against monopolies, labor and other. Another major variable is postwar banking policy, especially as to reserve requirements or permitted devices of corporation finance. (It would certainly clear the air, however, if banks as owners of federal debt were offered simply a two-way choice between "unsupported" consols and fully supported currency.) Finally, there is the relation between federal tax revenues and expenditures.

The rule for policy as to consols and currency, i.e., for *composition* of the debt including money, is simply stabilization of the value of money. Converting money into consols is an anti-inflation measure; converting consols into money is a reflationary or anti-deflation measure; and that is that. The problem becomes difficult or complicated only on the assumption that measures taken in other areas of policy will simply prevent stabilization, regardless of debt policy. Considering the amount of debt available to be monetized, the real problem here is uncontrolled inflation. Until this whole game is hopelessly lost, however, it is the business of debt policy to assume that it will *not* be lost and to *stick* to *its* appropriate anti-inflation measures *whatever the interest cost*. Above all, it should both assume and imply that the Treasury intends to *stay* in business, not just for ninety days or ten years but indefinitely, and issue its obligations accordingly.

Simple debt management would almost certainly improve policy and action in other areas. If Congress and the executive could finance expenditures only by taxation, by currency issue, or by borrowing, each in its most straightforward form,[1] we might ex-

[1] The proper tax form, as I shall argue elsewhere, is a holeproof personal income tax, with a high and stable basic rate, with a variable exemption level, and, of course, with extensive source collection.

It is interesting to speculate, in this connection, on how the democratic process would work if currency, instead of debt, were the residual element in fiscal policy or practice. Normally, of course, Congress makes appropriations and levies taxes, leaving the Treasury to cover deficits by borrowing, under generous, elastic, and routine authorizations, or to utilize any surplus for debt reduction. Suppose this practice were reversed, i.e., that all legislation regarding sale or purchase of debt (consols) were

pect really responsible behavior not only in these matters but in expenditure as well. Currency issue, as I have argued elsewhere, is both a more effective and politically a safer means of reflation or inflation than is (that compounding of opposites) inflationary borrowing, if only because the process and its possible abuses are generally understood. It would be hard politically to pursue obviously inflationary finance in the midst of actually inflationary conditions. Moreover, it would be politically more difficult to hold taxes down or expenditures up if the obvious cost was borrowing at open-market consol rates—with "danger" of having to pay through the nose later on to retire the current consol issues. On the other hand, it would be conveniently difficult to advocate or to pursue a scheme of combatting deflation by selling *consols* to private issuing agencies (banks). The case for currency issue instead of indirect deposit creation would be very clear.

Many readers will have recorded their categorical dissent from our proposals because these all imply a price-index rule or guide for policy. I persist in the notions that stabilization of the value of money, however unrealized, is the only rule or principle of monetary-fiscal policy we have ever had, that it is the only rule really available to a democratic society, and that only by recognizing and by accepting this rule explicitly can legislatures be made responsible financially or business be spared intolerable monetary uncertainty. Be that as it may. One may, I presume, reject price-level stabilization without embracing its opposite. Opponents, in the main, do not advocate maximum instability or total monetary uncertainty. Rather they recommend crossing bridges when we come to them, i.e., trusting to the authorities of the moment, if not crossing, bridge or no bridge, and finding the bridge afterward if you did not drown. Consequently, it may be of interest to see what kinds of measures are consistent with stabilization and what kinds are not, since no one is proposing to go squarely in the opposite direction. The important fact is that so many people are actually proposing measures or stressing considerations which lead where no one wants to go.

Let us first belabor those numerous folk who, while applauding, condoning or just not discussing the size of our debt, insist on keeping down its interest burden. The company is numerous, distinguished, and highly placed, both in government circles and in academic esteem. There is, to be sure, a grain of wisdom in their solicitude. First, the Treasury should never offer its issues on such terms that radical rationing measures are required; bonds should not be distributed like postmasterships. Second, the government should never raise interest rates by promoting, by encouraging, or by tolerating expectations of price inflation. These propositions about exhaust the truth in a mountain of foolishness. The truth assay is really very low.

Subject to these obvious reservations, the Treasury should seek always to pay as much interest as possible. (There may be impuri-

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mandatory, like tax legislation, and that all deficits or surpluses were handled automatically, under broad, permissive, continuing authorizations, by issuing or retiring currency. It is arguable that, if issue powers were really confined to the government (i.e., with 100 per cent or ceiling reserves), this scheme would produce more responsible fiscal policy than the prevailing one.

What we are really proposing, of course, lies in between. There would be no borrowing authorizations save for consols; i.e., the Treasury would have no freedom or discretionary power with respect to maturities, and possibly none as to nominal interest rates. Subject to that limitation, however, and a mandate to stabilize a price index, the Treasury would have generous or unconfining authorizations for both currency issue and borrowing. Revenue surpluses or deficits would then determine the decrease or increase in the aggregate of currency and consols; while the necessities of price-level stabilization would determine changes in the relative amounts of currency and consols. Excessive expenditure relative to taxes would then reflect itself in the increase of consols or, with an inordinate amount outstanding, in failure of a proper debt-reduction program. A mass electorate may be expected to understand the virtues of price-level stabilization and the need for conserving borrowing powers against the contingency of war or, during wars, against the contingency of very long war. It might, with a simple debt structure, recognize practices which jeopardized or sacrificed these objectives and effectively threaten the political future of leaders who indulged or espoused such practices.

ties here, but I have not found them.) This merely amounts to saying that it should pay enough interest to prevent inflation. On the other hand, as a corollary, it should also always issue as much money as can be issued without raising the price level. Thus, it should simultaneously maximize the rate of interest payment and maximize the amount of noninterest-bearing issue, subject to the same condition, namely, a stable price level or index.[2]

Since it is difficult to argue about axioms, I shall attempt only some elenctic remarks. First, if one *wants* to minimize the nominal interest cost, one may best resort to paper money. It is admittedly improper to issue additional currency when inflation is under way. By the same token, it is wrong to issue short maturities or, indeed, any debt form save that furthest removed from the pure-money category. In such circumstances issue-yields will normally vary directly with maturities. Consequently, when we want to stop inflation, we should maximize interest rates; we should mop up money not with other moneys slightly disabled but with money contracts as much unlike money as possible. Conversely, stopping deflation, we should issue not near-moneys but the real thing without disabilities; and, issuing it, we should displace not near-moneys but as-far-from-money-as-possible moneys.[3]

During actual or imminent deflation, on the other hand, it may be better to borrow at short term than at long term; but it is best not to borrow at all, i.e., to issue merely currency, not only for the desired immediate effect but also for long-term safety and minimal national misunderstanding. Borrowing is an anti-inflation measure, not a proper means for financing reflationary spending. Borrowing is properly a means for curtailing purchasing power, private and governmental. To use it for injecting purchasing power is (to repeat a figure I have used elsewhere) like burning the fire engines for heating purposes when there is an abundance of good fuel to be had free.[4]

To repeat, the right way to lower interest costs is to issue paper money—which sometimes is and sometimes is not a proper thing to do.

Let us now argue obliquely from another direction, namely, from the standpoint of the Treasury as central bank (which it alone should be). Here is the one aspect of the traditional monetary-fiscal pattern which has been mainly correct—indeed, the only one where perverseness has not prevailed. It is naturally also the phase of action with respect to which orthodoxy is most nearly sound. It is generally agreed that the Treasury, at least in disguise, should sell bonds to banks in boom times and buy them during severe deflation. This obviously means, in general, seeking to maximize capital losses over time, concentrating purchases at bond-

[2] These references to "maximizing," and others which follow, are perhaps polemic extravagances, for the "conditions" alone imply determinate amounts.

[3] For merely monetary purposes, of course, open-market operations should be conducted with equities, not with money contracts at all. Only a collectivist, however, may intelligently offer this counsel of monetary perfection. With ultimate control lying in revenues and expenditures, the strong case for any open-market measures lies where there is an interest-bearing debt requiring some management in any case. There is little reason, in an economy where government is already surfeited with (misused) monetary powers, for admiring the collectivist state for its still larger powers.

[4] It does not follow that debt should never be retired during prosperous years, though it certainly should be retired more slowly at such times, and not at all unless inflation is otherwise fully under control. If tax rates are properly sustained and increased during prosperous years, open-market operations may properly show a balance of purchases even at such times. In depression or deflation, debt retirement should reach its maximal rate, as part of a deliberate program of monetizing bonds. For the good future, retirement of our huge war and pre-war debt will be a continuous process at varying rates, not a matter of alternate forward and backward steps. There will be no more sense in sustaining the aggregate amount than there was in acquiring it in the first place. If our democracy again becomes responsible financially, our bonded debt will fall at least as rapidly after this war as it did during the twenties. Borrowing power must be carefully conserved if only against the inflation contingencies of our next (first) total war. Unused borrowing power and a record of fiscal good faith (which it is still our opportunity to initiate) are now grossly undervalued relative to an army and navy; but I'll lay my bets for the future on an America which protects internal unity and morale by real fiscal prudence.

price peaks and concentrating sales at the lows.[5] (Why such inherently lossful responsibilities were ever delegated to private corporations, I have never understood.)

Surely it is logically or heuristically permissible to treat such capital losses as part of the cost of servicing the debt. Indeed, in an institutionally well-ordered democracy, based on systematic dispersion of power, it would probably seem silly to regard them otherwise. One of the costs of living with near-moneys, even though they be no nearer than consols, lies in the necessity of forever buying them dear and selling them cheap, as monetary stabilization necessitates. Even if we evade the responsibility of rapid secular amortization, we must always be prepared to give money freely for bonds when they are most valuable and to take money for bonds when they are least valuable.

Thus, we may charge that proponents of minimal "controlled" rates on our federal bonds are inconsistent unless they also propose to reverse traditional rules about open-market operations. Surely the formal interest burden could be diminished or offset budgetwise if "perverse" rules of Federal Reserve practice were "put straight," if Reserve Bank capital-gain profits were recaptured, and if the revenues thus smartly obtained were used instead of taxes to pay bond interest! There should be no trouble in selling the scheme, for it only involves asking the Reserve banks to make more money and to follow accepted Treasury practice instead of attempting to stabilize prices—which, behavior notwithstanding, they have always denied trying to do and certainly have not the power to do. Indeed, even for intelligent people, it may seem wise to do everything wrong consistently, since the shortest political route to thesis may involve going all the way to antithesis first.

It is now fitting to pass comment on some minor variants of the antithesis. Some people, while commending and condemning mildly a little bit of everything in practice, have steeled themselves to accept postwar refunding into longer if not indefinite maturities but still lack the fortitude to accept possible high costs of debt retirement. Thus, they veer toward a consol form for the bondholder but leap back toward money for the Treasury via wide or indefinite "call" options. Here the inconsistency noted above is just reversed. The advocate of call features, while accepting higher interest rates, seeks to avoid the illusory misfortune of contingently high bond prices. Escaping one horn of a spurious dilemma, he impales himself on the other; or, in a better figure, he avoids Scylla by smashing upon Charybdis.

The proper way to avoid high prices for retired debt is to avoid deflations, i.e., to maintain private investment and reasonably attractive alternative investment outlets for private funds. Labor and patent monopolies, among others, may make this difficult to achieve by monetary measures; but debt policy should do its best willy-nilly and stick to its price-level guns. If we must have deflations and high consol prices, the more the government has to pay for its debt the better. Surely it does not aggravate the task of monetizing debt to have opportunely high bond prices! With effective monetary stabilization and the sustained prosperity which it would assure in a free-market economy, there would be no wide sweeps in bond prices. But it will do no good, and some harm, to control this monetary thermometer when the task is one of stabilizing the monetary temperature. Even penny-pinchers should not complain if the community asks high prices to exchange its bonds for noninterest-bearing obligations and makes this conversion harmless by its increased demand for socially costless liquidity.

We are asking people now to buy war bonds which it is here traditional to default on substantially, via inflation—and with only optimists expecting a small default this time. Against this near certainty and the enduring risk of further wild inflation, there is the relatively small chance of nominal gain through eventual decline of interest rates. This remote favorable contingency the call feature is designed to remove! Save

[5] The losses, of course, may properly be minimized by avoiding instability, i.e., by making stabilization measures really effective.

for indefinite forced lending (and do not suppose there will ever be none of it), call features can only raise the interest rate[6] and, besides, create an implied obligation to support the market, i.e., to convert bonds into money at the worst times, if not, indeed, to make them really money all the time.

We have proposed, to repeat, that our debt be wholly and promptly converted into currency and consols, in whatever proportion is requisite for price-level stabilization. Such action, as already intimated, would place banks in a quandary. They would be loath to take consols, because of the loss of liquidity. They would be loath to take currency because of the loss of interest revenue, unless permitted to compound the currency by their own expansion of investments and deposits. The proper answer here is as simple as it is remote from our thinking or from our likely actions. Those institutions which choose cash should find their reserve requirements radically increased thereby (to or toward 100 per cent)—and should find their revenues in service charges. Those which choose consols should find their equity requirements increased (also ultimately and ideally to 100 per cent)—and should thereafter become largely or exclusively investment trusts. Thus, we only repeat proposals for the 100 per cent reserve scheme—for which I still have no great enthusiasm save as part of a gradualist program whose objective is recognized (and consistently pursued) as gradual reduction and ultimate denial of borrowing and lending powers to all corporations, especially as regards obligations of short term.

Misguided fiscal practice and unguided institutional evolution have placed us in a foolish quandary. Seemingly, we cannot afford prosperity or full peacetime employment because they would render our banks insolvent and increase interest costs of our federal debt! Conversely, one way to keep our banks solvent and our interest costs at a low level is to render private investment so unattractive, and property so insecure, that people will be glad to hold money and deposits in preference to real assets and delighted to buy money in an interest-bearing form. The dilemma again is wholly spurious, save for those who deplore increase in reserve requirements of banks (or our reluctance to accept collectivism). The government, instead of worrying about interest costs, should covet the large revenues which high prosperity and high interest rates bring along—while always eschewing, of course, the too easy route of deliberate or permitted price inflation, which must sometime produce astronomical interest rates if not eschewed. Let us pray for the highest interest rates consistent with monetary stability—for the highest possible "real" marginal efficiency of capital. Prosperity need not prove insufferable or disastrous.

There is urgent need for reducing discussion of monetary and fiscal problems to simple, common-sense terms. Our financial system is becoming simply too elaborate and too complex for the political system within which it operates. Both private financial institutions and fiscal practice are too complicated for government by law; i.e., they are not sufficiently amenable to effective control though the democratic process of action out of discussion and deliberation. Needless complexity in the private financial structure is heritage of bad policies in the past and should gradually be corrected and removed. Needless complexity in government finance can and should be dealt with by prompt, thoroughgoing measures.

Taxation, expenditure, pure debt, and pure money are, along with price level, quite intelligible conceptions. If institutional borrowing and, especially, institutional issue were exclusive governmental prerogatives, and if these governmental prerogatives were exercised only in the most straightforward way, both economists and the public might quickly and wisely distinguish between proper uses and abuses and, thus, democratic government might adhere to sound fiscal-monetary policies. The proper first step is simplification of our federal debt.

UNIVERSITY OF CHICAGO

[6] The captious critic will note here an exception to my general rule about maximizing interest rates!

A NOTE ON THE USE OF THE WORD "CURRENCY"

IRA B. CROSS

Economists make their living by taking in each other's definitions.—BEVERIDGE

DURING the past several decades we economists have experienced considerable confusion and disagreement in connection with the use and definition of the word "money." It has come to designate practically anything that a writer wishes it to cover, from "a medium of exchange that has general acceptability" to any medium of exchange no matter what its characteristics may be. Some economists have even gone so far as to include demand and savings deposits, which as such never become part of the circulating media of a country. Lately we have had the same confusion and disagreement in the use and definition of the word "currency."

During the eighteenth and early nineteenth centuries the words "money" and "currency" were used interchangeably, which caused Macleod in 1836 to declare:

> To call Money by the name of Currency is one of the most extraordinary abuses of language that has ever occurred. In old times men used to speak of money being current, as it passed from hand to hand. Hence arose the expression the *currency* of money. . . . . But about the beginning of the last century by a most extraordinary confusion of ideas, and, as far as we have been able to discover, it arose in our American colonies, the Money itself was called Currency.[1]

Then followed a period of about a century during which "currency" was applied only to paper money. Lately, however, it has been employed by many economists and others to include not only coins and paper media of exchange which have been authorized by Congress (metallic and paper money in the formerly accepted use of the term "money"), but also credit instruments and bank credit as well. Reed, for example, states that currency is

> a word that connotes solely that which circulates and is physically transferable; . . . . the term . . . . can be confined to those elements the tender of which discharges the obligation. . . . . The term "currency" will include three subelements . . . . bank credit. . . . . Transfers of such credits on the books of banks . . . . coins, government bills, bank notes.[2]

Leffler gives a peculiar twist to the meaning of the word by stating that it applies to "all media of exchange which possess *limited acceptability* in exchange for goods and services in a particular community. In most places, this definition applies to personal checks, promissory notes, and bearer securities."[3]

In the practical world of banking the same type of confusion exists. Bankers in conversation and in their sworn "Statement of Condition," which they file with state and federal regulatory authorities, employ the word solely with reference to paper money. Federal statutes have been most definite in applying the word only to paper money. "National currency," for example, referred to national bank notes, and "fractional currency" to the Civil War paper money with denominations less than one dollar. The Comptroller of the Currency was given jurisdiction only over national bank notes, not over metallic money. Section 15 of the Gold Reserve Act of 1934 states that

> currency of the United States . . . . means currency which is legal tender in the continental United States, and includes United States notes, Treasury notes of 1890, gold certificates, silver certificates, Federal Reserve notes, and circulating notes of Federal Reserve banks and national banking associations.

Only paper money issues are enumerated. Section 6 of the same Act states that "Except to the extent permitted in regulations which may be issued hereunder by the Secretary of the Treasury with the approval of the President, no currency of the United States shall be redeemed in gold." The use of the word "currency" in this section of the

[1] H. D. Macleod, *The Theory and Practice of Banking* (3d ed.; London, 1876), I, 29.

[2] Harold L. Reed, *Money, Currency and Banking* (New York, 1942), pp. 6–7.

[3] Ray V. Leffler, *Money and Credit* (New York, 1935), p. 16.

law again refers to paper money issues, because our monetary statutes have always applied only to them when the term "redemption in gold" has been used. Thus, it appears logical to conclude that Congress intended that the word "currency" should apply only to paper money.

Some governmental agencies and many economists have presumably ignored the above congressional definition or have not been aware of its existence, for they sometimes use the word "currency" to apply only to paper money, at other times to apply to all media of exchange (including credit instruments), and occasionally to apply to coins, paper money, credit instruments, and bank credit. The annual reports of the United States Treasury and the Comptroller of the Currency consistently separate "coin" from "paper currency"; those of the Board of Governors of the Federal Reserve System most frequently, although not always, use "currency" to include only paper money. The Federal Reserve banks, which act as redemption agencies for the United States Treasury, explicitly separate metallic from paper money as they annually report the amount of "coin" and "paper currency" which they have "received and counted." But the *Federal Reserve Bulletin* carries a statement of "Treasury Currency" which includes "silver coin and silver certificates, United States notes, Treasury notes of 1890, Federal Reserve bank notes, national bank notes and minor coins." It will be noted that Federal Reserve notes are not included, and prior to 1933, when gold coins and gold certificates were still in circulation, they also were not included. The statement of "Treasury Currency" has been carried by the *Bulletin* since 1929. Also, each month the *Bulletin* publishes a statement of the "United States Money in Circulation," in which currency and coins are differentiated, "currency" in this table applying only to paper money. Again, in the June, 1943, and April, 1944, *Bulletin*,[4] the articles "Currency in Circulation" employ the word to include both coins and paper money. In *Banking Studies*,[5] a publication of the Board of Governors, the word is applied at times only to paper money and at times to both coins and paper money. This "muddying of the waters" by the young economists who write the publications of the Board is undoubtedly due to their having been brought up in the Keynesian tradition.[6]

If "currency" is to be applied to both paper and metallic money, then we should use the term "paper currency," which we do, and "metallic currency," which we do not. If "currency" is to include all media of exchange "employed to discharge obligations," then it should also apply not only to coins and paper money but also to checks, drafts, and all other credit instruments, but not to bank deposits of any kind, for they are never media of exchange.

Frankly, I am not willing to admit that an improved terminology has resulted from the efforts of economists and certain governmental authorities to re-write the definitions of "money" and "currency." I still think that the old standard definition of money as being "any medium of exchange that has general acceptability" cannot be improved upon. The use of credit instruments, unlike money, involves confidence and deferred payment; they are never legal tender; and no credit instrument serves as a unit of account or as a unit (standard) of value. Credit instruments do perform some of the services of money, and if we wish to employ a term embodying both of these types of purchasing media, we can simply call them "media of exchange." If we wish to include bank deposits along with money and credit instruments, which is advisable and useful in some types of analysis, we can have recourse to the word "funds." But by all means, let us continue to use "currency" as applying solely to paper money.

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[4] Pp. 497 ff. and 318 ff., respectively.

[5] Chap. iii, "Currency System of the United States," pp. 65–86; chap. xiii, "Money System of the United States," pp. 295–322.

[6] Cf. J. M. Keynes, *A Treatise on Money* (New York, 1930), Vol. I, chaps. i–iii.

BOOK REVIEWS

The Decline of Liberalism as an Ideology: With Particular Reference to German Politico-legal Thought. By JOHN H. HALLOWELL. ("University of California Publications in Political Science," Vol. I, No. 1.) Berkeley: University of California Press, 1943. Pp. xi+145. $1.50.

There is great need for a critical analysis of twentieth-century liberal thought, for, wherever Fascist ideology has been victorious or has at least gained influence, it has fed upon the weaknesses of liberal theory and practice. A critical revision of the political philosophy of liberalism is, then, indeed an urgent task of both theoretical and practical importance.

Hallowell deserves to be commended for having chosen such a subject at all. He also deserves high praise for the degree of success he has achieved. This success is, however, considerably greater in the first, than in the second, half of his book. The author is at his best when he describes in the concept of "integral liberalism" an ideal type of liberalism which serves as a yardstick for the evaluation of the historic development. This integral liberalism comes, in the latter part of the nineteenth century, under the influence of historicism and positivism. Thus it loses its reference to concrete political situations, as well as to absolute ethical standards, and is transformed into a system of abstract concepts which are devoid of political substance and on the basis of which it is no longer possible to distinguish between good and evil in the political sphere. This story of intellectual and political decadence is brilliantly told and is, indeed, an important contribution to political thought.

When the author endeavors to connect this story with the politico-legal thought of modern Germany, this reviewer feels constrained to file a dissent. However difficult, if not impossible, it is to understand and judge the intellectual history of a country from the outside, the author cannot have been unaware of the absence of a liberal tradition in German legal thought. How, then, is it possible to hold responsible for the decline of German liberal thought, on the one hand, Gerber, Laband, Jellinek, Stammler, and Kelsen, and, on the other hand, Lasson, Kohler, Erich Kaufmann, and Carl Schmitt, none of whom, with the exception of Kelsen, can be classified as a liberal and most of whom, especially Laband, Stammler, Lasson, Kohler, Kaufmann, and Schmitt, were most emphatically antiliberal? Yet genuine liberals, such as Preuss and Anschuetz, are completely neglected; and Heller has been rated by very few as highly as by the author.

Kelsen, however, is the only genuine liberal of those mentioned, not because he has created the "pure theory of law," against which the author advances, strangely enough in the name of "liberalism," all the standard arguments of the German antiliberals, but because he has made in *Wesen und Wert der Demokratie* one of the most original and profound contributions to the theory of liberalism. Yet this book Hallowell does not even mention. Against the accusation that "he actually fosters individual irresponsibility" Kelsen does not need to be defended by this reviewer or by anybody else who has witnessed the profound moral influence Kelsen's personality and writings have exercised upon the political theory and practice of many lands. Yet this and similar remarks, as well as the underlying thesis of the whole book, pose the general problem of the relationship between political thought and political action. The author seems to believe in the primacy of political thought and, consequently, in the responsibility of the declining political philosophy of liberalism for the decline of liberal political institutions. This is an interesting thesis which, however, needs further elucidation in the light of history, sociology, and political thought alike.

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The New Leviathan, or Man, Society, Civilization, and Barbarism. By R. G. COLLINGWOOD. Oxford: At the Clarendon Press; New York: Oxford University Press, 1942. Pp. viii+387. $6.00.

In 1938 Collingwood wrote at the end of his autobiography: "I know that Fascism means the end of clear thinking and the triumph of irrationalism. I know that all my life I have been

engaged unawares in a political struggle, fighting against these things in the dark. Henceforth I shall fight in the daylight." This book, written in great part during the bombardment of London, as he tells us, and completed shortly before his death in 1943, is the fulfilment of that resolve. It is written with a crescendo of wrath against "the fourth barbarism: the Germans," the three earlier "barbarisms" being the Saracens, the Turks, and the Bogomils, associated with the "Albigensian heresy." In an intricate discussion of the social and nonsocial conditions of political life (reminiscent of Toynbee's "Dominant Minority," "Internal Proletariat," and "External Proletariat"), the author builds up his massive indictment, not against the Nazis and their sympathizers merely, nor against the present population of the German Reich, but against the "latent barbarism" of the German people throughout its history.

The nucleus of *The New Leviathan* is chapter xxiv, "The Body Politic, Social and Non-social," in which the life of the body politic is conceived as a gradual movement from the state of a nonsocial community ruled by the strong toward the state of a society of citizens corporately ruling themselves and having noncitizen dependents. This was the great discovery of Hobbes: "that 'the sovereign' does not rule by force at all, but it still rules; it rules by authority .... because the constituent subjects .... have achieved social life and are therefore able to confer authority" (24.48). On this prime discovery is based the theory which Collingwood calls the "classical politics," comparable to the classical physics of Galileo and Newton. It was a theory worked out by Hobbes in the middle of the seventeenth century and restated, with minor changes, by Locke at the end of that century and Rousseau in the eighteenth. During the nineteenth century it went into a decline under Hegelian and Marxian criticism, heralding the outbreak of the fourth barbarism.

Not until halfway through the book does the author disclose his method of reasoning. It is a method of "dialectical discussion," with principles of explanation that have a specialized connotation of the word "dialectic." The arguments in the earlier chapters might have been less baffling had he first stated explicitly what he means by "dialectical discussion" and the body politic as "a dialectical thing" (24.6–24.68). "The essence of dialectical discussion is to discuss in the hope of finding that both parties to the discussion are right." How can the intellect "find its way about in a Heraclitean world" in which everything moves and nothing stays still? "The answer is: *think dialectically*. .... According to Hobbes *a body politic is a dialectical thing*, a Heraclitean world in which at any given time there is a negative element .... of non-sociality which is going to disappear, or at least is threatened with abolition by the growth of the positive element; and a positive element .... of sociality." Collingwood is not dealing with his subject matter as an experimental psychologist might analyze it, on the one hand, or as an economist or political scientist might describe it, on the other. As a dialectician, engaged in discussion, he is primarily concerned with what the various *concepts* of man, society, civilization, and barbarism mean, their mutual inclusions and exclusions, and how their "oppositions" can be resolved in a higher synthesis.

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Bread and Democracy in Germany. By ALEXANDER GERSCHENKRON. Berkeley: University of California Press, 1943. Pp. viii+238. $2.75.

This book, the content of which is not altogether clear from its allusive title, is a valuable contribution to the understanding of a problem that has long disturbed the peace and prosperity of Germany and of Europe and will again confront the peacemakers at the end of the war. It is a study of the effects of high-cost staple-grain production, a vested interest of the great Junker landowners of the region east of the Elbe River, upon the economic and political welfare of the German people. The study shows the effects to have been harmful and concludes with proposals for the elimination of the Junkers and a major reform in German agriculture. The author disclaims any original research, documenting his text with copious references to the outstanding authorities in the field: Weber, Sering, Aereboe, Roepke, Jasny, Rowntree and Brandt, not to mention others less frequently cited. He has gathered the testimony of these European (mostly German) economists, made it available in English, and seasoned it with enough wisdom of his own to give us an incisive criticism of German agricultural policy and some constructive suggestions for the statesmen of the United Nations.

Although Mr. Gerschenkron's main concern is an indictment of the Prussian Junkers, it seems more appropriate to this reviewer to judge his work as an essay in tariff history and agricultural policy. He states his purpose of indicting the Junkers in his Preface, but by the time he has finished his fifteen-page Introduction he has already expanded the indictment into the thesis that protective grain tariffs are incompatible with democracy. In support of the thesis he offers a rather detailed history of German grain tariffs from the onset of American competition in the 1870's to the present. This history comprises all but a few pages of the two main sections of the book, entitled, respectively, "Agricultural Protection in the German Empire" and "Junkers versus Republic." Individual tariff bills and schedules and all the subterfuges known to protectionist pressure groups are described, and the Junker influence behind them clearly established. Much of this makes familiar reading to students of economic history, but the author's interpretation of it in terms of his large thesis is fresh and compelling.

In his final section, "The Battlefields of Peace," Mr. Gerschenkron presents with cogent argument a number of specific proposals for the postwar reorganization of German agriculture. Here, too, he follows a trail already blazed by leading German economists and liberal politicians. By the vigorous exercise of state initiative, he would bring about the gradual conversion of the eastern-Elbian grain estates to forest land or to the intensive cultivation of high-grade foodstuffs, depending on their soil and productive capacity. The estates themselves would be placed under co-operative management or broken up into small, independent units, all of which would be accomplished by national—or international—planning, enforced by monopolies, price control, subsidies, and, for the time being, even tariffs. By such means, rather than by political liquidation, the foundations of *Junkertum* would be swept away, the baneful, antidemocratic power of the Junkers destroyed, and German agriculture placed in a far sounder relationship to the total German—and European—economy.

From first to last, Mr. Gerschenkron brings a much more effective indictment against the grain economy of eastern-Elbian Germany and the tariffs that protect it than he does against the Junkers. Protectionism was not their only, or even their most serious, offense against economic and political democracy in Germany. They were, and still are, the *fons et origo* of a way of life, known to us as "Prussianism," that is a far more deadly enemy of democracy than protective tariffs. As protectionists, they were no worse than the industrial magnates and militarists with whom they made common cause. As members of a social caste dating back to the twelfth century and wielding a political influence out of all proportion to its size or economic significance, they present a phenomenon almost unique in history. A conclusive indictment of the Junkers would have demanded much more attention to the historical and sociological aspects of this phenomenon than Mr. Gerschenkron has given them. Even in the realm of economics, he has neglected one of the prime factors in his case, namely, the practice of entailment. Nowhere does he mention the *Familienfideikommisse*, which, by prohibiting mortgages, froze the capital assets of so many of the eastern-Elbian Junkers in land and led them to eke out—by tariffs, disguised subsidies like import certificates, or open subsidies like the *Osthilfe*—the funds they could otherwise raise only on personal credit.

For a final verdict against the Junkers Mr. Gerschenkron's evidence is too specialized. As an essay in German agricultural policy, it is one of the best in English.

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The Danube Basin and the German Economic Sphere. By ANTONÍN BASCH. New York: Columbia University Press, 1943. Pp. xviii+275. $3.50.

Dr. Basch's book presents a thorough and expert analysis of the economic structure of a region whose unsolved problems have twice set the whole world afire. It deals with the economic history of the Danube Basin and the Balkan Peninsula in the period between the two world wars. In this period the heritage of the Habsburg empire, namely, the economic and political integration of the larger part of the Danube region, was thrown to the winds. The Succession States, eager to develop their own industries and quasi-autarchic national economies, found themselves unable to cope with the impact of the world economic crisis. Subsidies, to sponsor "export" into neighboring countries that had formerly been part of the internal market, came

more and more into use and were speeded up by artificial monetary stimulants.

Naturally, these stimulants did not prove effective; and equally ineffective, as the author shows, were the political cures that coincided with them: the Little Entente, under Czech leadership, Mussolini's hectic expansionism, and André Tardieu's attempt to include the region in the traditional anti-German system of French alliances without, however, committing his country to anything more than cheap gestures.

No wonder that the region, under these conditions, succumbed to the magnetism of the recovering German economy. The German market became increasingly important to the agrarian countries of southeastern Europe, both with regard to exports and to imports, while Germany was in no way dependent upon them as customers of industrial goods. This tendency was reinforced, as the author shows, by Germany's adoption, during the twenties, of strict agrarian protectionism and by the simultaneously growing inclination toward bilateral trade agreements with partners that were in desperate need of disposing of their otherwise almost unsalable surplus products. German penetration was well planned and well executed.

The author argues against those who conclude from all this that German and southeastern European economy are necessarily complementary. Germany, he holds, has not developed the region but has exploited it, in the way the great colonial powers have exploited their overseas colonies. Germany has disrupted the monetary systems of Danubian and Balkan Europe, relieved the countries of the Southeast of their agricultural and mineral, and even their human, resources at a cheap price, and supplied them, in return, with German industrial goods. There is, however, no reason, the author goes on to say, why the southeast should be eternally a semicolonial region. If the wealth of the region were developed by the Western powers, it could be an important and independent partner in a future European system.

It is interesting to note that Dr. Basch, in his otherwise well-considered analysis, does not seem to envisage that this might weld Germany and the southeast, on the basis of economic equality, more intimately together than ever. Is it perhaps that he writes *pro domo?* Dr. Basch has been one of the leading economic experts of the former Czechoslovakian government. He certainly would like to block German industrial expansion in favor of Czech expansion, and he actually advocates, for that purpose, the separation of Austria from the Reich; he must likewise advocate other measures designed to keep Germany continuously in check. This reviewer doubts whether this would be to the interest of the Western powers. It might, however, be to the interest of Russia.

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The Early History of Deposit Banking in Mediterranean Europe, Vol. I. By ABBOTT PAYSON USHER. ("Harvard Economic Studies," Vol. LXXV.) Cambridge: Harvard University Press, 1943. Pp. xx+649. $5.00.

Professor Usher's book is the first of two volumes to be devoted to early deposit banking in Mediterranean Europe. The present book is divided into two parts. Part I, by way of introduction to the volumes, gives a general description of the main features of the early credit system. Part II tells the story of the Municipal Bank of Deposit of Barcelona from its inception in 1401 until its merger with another municipal institution, the Bank of the City of Barcelona, in 1723. The amalgamated bank continued to do business until 1853, when its affairs were taken over by the Bank of Spain. The second volume will deal mainly with the history of banking in Italy, where banking developed much earlier than in Spain and assumed far greater importance.

There exists a tendency in this country to exaggerate the significance of the development of banking in England during the period immediately preceding and following the English Civil War. With the exception of a few specialists, many economists are not sufficiently aware of the fact that, on the Continent, the origins of banking can be traced back to the early Middle Ages. In the fourteenth century a well-organized banking system flourished in such centers as Venice, Genoa, Florence, Barcelona, and Bruges. It is hoped that the appearance of Professor Usher's book will contribute to the diffusion of more accurate knowledge concerning the early history of banking.

Contrary to common ideas, the use of money substitutes played an important role in the economy of the more advanced countries of medieval Europe. It is well known that, in foreign trade, bills of exchange were extensively used in order to avoid the risk and the expense

of shipping specie. But, even in local trade, specie payments were largely eliminated and replaced by credit transfers on the books of a deposit bank. Checks were not in general use, but oral orders of transfer performed the same function.

Professor Usher rightly emphasizes the importance of credit creation by the medieval banks. Since they operated on a fractional-reserve principle, there can be no doubt that their investing and lending activities had inflationary results. The early deposit or transfer banks extended credit chiefly under the form of overdrafts, but they also invested part of their excess reserves directly in trade. Bank credit, as the author points out, was quantitatively important. It is certain that transfers in bank were commonly accepted in discharge of debts, especially among merchants.

One of the main defects of the medieval credit system was that neither checks nor bills of exchange were negotiable instruments. As a result, the assets of medieval banks were not liquid, in the sense that they could not be shifted. The absence of negotiable instruments, however, did not preclude the existence of some kind of clearing arrangements among banks.

One of the most illuminating chapters in this book deals with the slow development of the concept of negotiability. Although medieval letters obligatory often contained the "payable-to-the-bearer" clause at an early date, it took a long time before the same principle was applied to bills of exchange and before indorsement gained recognition, both in practice and in law. The earliest indorsed bills cited by the author are dated 1610.

Part I also has interesting chapters on fairs and international clearance, on medieval and modern currencies, and on long-term credit and public debt. These chapters are useful surveys but contain little that is new to those acquainted with foreign publications.

There are a few points that require emphasis with respect to the Municipal Bank of Barcelona. From the start, this institution became the fiscal agent of the city of Barcelona and, within a few years, of the principality of Catalonia as well. Private customers were not allowed to overdraw their accounts, but the bank made advances to the city and indirectly to the principality. As early as 1462, the bank ran into trouble because of excessive loans to the city of Barcelona. Specie payments had to be suspended and were only resumed in 1468 by funding the existing demand liabilities. From an early date, the private bankers tended to keep part of their reserves on deposit at the municipal bank. Curiously enough, this tendency was opposed by the bank's administrators, who regarded the private bankers as competitors. This attitude of the administrators probably nipped in the bud the growth of some form of central banking.

It is regrettable that the war will delay the publication of the second volume. Its appearance is eagerly awaited because the picture is incomplete without a description of Italian developments. In addition to the new material on the Bank of Barcelona, Volume I has much useful and important material that is not readily available either in English or in other languages. This published volume will lend itself, therefore, to extended use.

RAYMOND DE ROOVER

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La Epoca del mercantilismo en Castilla (1500–1700). By D. JOSÉ LARRAZ LÓPEZ. With a commentary by D. RAFAEL MARÍN LÁZARO. Madrid: Real Academia de Ciencias Morales y Políticas, 1943. Pp. 161.

This 130-page essay is the typical *discurso de recepción*, or maiden address, required of newly elected members of the Spanish academies. The *contestación* by Sr. Marín Lázaro (pp. 139–61) contains a few rambling remarks directed at the principal discourse and a eulogistic résumé of its author's career. Lawyer, historian, journalist, professor, and author, in 1939 Sr. Larraz López became General Franco's minister of finance at the age of thirty-five.

Based upon relatively few published documents and not over a handful of manuscripts, Sr. Larraz' study of Castilian mercantilism represents, in the main, a synthesis and interpretation of other scholars' research. The quality of the synthesis is generally excellent. Clear, concise, critical yet moderate in tone, and accurate in translating foreign texts, the book does a commendable job of acquainting Spanish readers with recent findings of non-Spanish economic historians. (Curiously, Haring's *Trade and Navigation* is cited without reference to either of the Spanish versions.) Besides reviewing modern monographs, the essay re-examines the writings of early Spanish economists, some of whom have failed to receive full credit for their

keen understanding of the economic processes in Spain's rise and fall under the Hapsburgs. Larraz accepts the thesis which, with the accumulation of evidence, seems no longer controversial; namely, that Spain forged ahead economically as well as politically during the greater part of the sixteenth century but in the seventeenth declined both absolutely and relatively. Monetary, political, geographical, and psychological factors contributed to the breakdown of domestic industry, which languished while foreigners supplied the colonies through the "legal" channel of the Seville-Indies trade and succumbed when foreign enterprise abandoned all pretense of observing the prohibitions against traffic with the Spanish New World. Even in the seventeenth century arts and letters flourished; but "with Don Quijote alone a vast empire cannot be kept intact."

In chapter iii ("The Quantity Theory of the Salamancans") Larraz endeavors to create for Tomás de Mercado a larger niche in the history of monetary thought than Professor Hamilton and other defenders of Bodin's contribution have been willing to concede to the Spanish theologian. According to Larraz, Mercado explained the phenomena of the price revolution as accurately and as adequately as Bodin, without having known of the latter's work. Of this, he believes, Hamilton would have been convinced if he had read Mercado thoroughly. This criticism constitutes the major fault-finding in a book otherwise exceptionally laudatory of the labors of American scholars.

Mercado evoked the following comments from Hamilton:

> Although Mercado recognized the theoretical importance of the quantity of money as a price determinant, attributed the inordinate living costs in the Indies to the plethora of specie . . . . he apparently failed to mention the heavy output of the Mexican and Peruvian mines as a cause of the Price Revolution in Spain [*American Treasure and the Price Revolution*, p. 290].

> Many passages in Tomás de Mercado's *Suma de Tratos y Contratos* strongly suggest that he was aware of the influence of American treasure upon prices and that he neglected to say so because he thought everyone else knew as much [*ibid.*, p. 295, n. 2].

Concerning Bodin, he wrote that the French economist "was the first to demonstrate by careful analysis that the American mines were the principal cause of the Price Revolution, to amplify this view, and to refute rival explanations" (*ibid.*, p. 293).

Mercado's treatise, though published the year after the appearance of Bodin's *Response*, was censored for the press on May 9, 1568; and it is entirely possible, as Larraz believes, that Mercado had not seen Bodin's work before he completed the *Suma de tratos*. Passages quoted by Larraz show that Mercado said more than once that the abundance of specie was the *principal* cause of high prices, not only in the Indies but in Spain and, with decreasing effect as one moved away from Seville, in the rest of Europe. Mercado did not refer specifically to the treasure from the mines of America nor did he develop by "careful analysis" the significant relationship between the quantity of specie and prices. Sr. Larraz neglected to advise his readers that Hamilton hedged his estimate of Bodin by stating that his right to fame "fundamentally rests upon the orderly and cogent presentation of his thesis and its influence upon scientific thought" (*op. cit.*, p. 293, n. 6).

Larraz also discovers in the work of Mercado some modern notions of foreign exchange. In particular, Mercado explained variations in foreign exchange rates in terms of the discrepancy in the commodity price levels of Spain and other regions. Apparently, he had an inkling of the specie-flow mechanism and, if allowance is made for differences in terminology, of purchasing-power parity. How well Mercado really understood economic phenomena remains to a large degree a matter of guesswork, as he often reduced his ideas to a few offhand and frequently cryptic sentences.

The volume under review lacks both index and bibliography; and "sloppy" appears to be the kindest way to describe the sparse references, which sometimes consist of nothing more than "*op. cit.*"

ROBERT S. SMITH

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French Mercantilism, 1683–1700. By CHARLES WOOLSEY COLE. New York: Columbia University Press, 1943. Pp. viii+354. $4.25.

This competent and careful study is a continuation of an earlier work by the same author, *Colbert and a Century of French Mercantilism*. The great collections of documents at the National Archives have been more extensively utilized by Cole than by any other writer in Eng-

lish. But there is strangely little that is really new. The work of Levasseur and Boissonade has already made available the general content of these records and has given us a sound knowledge of the development of economic policy in this period. It is now fully fifty years since the extensive publication of documents by Boislisle placed the outstanding texts at the disposition of the erudite. Any novelty the work may possess for English readers will be due to their long-continued neglect of this important period.

Had the author brought to the study some new values, it might easily have become an impressive and important contribution to the analysis and discussion of public policy. Complacent acceptance of familiar concepts of mercantilism made it impossible for the author to raise new issues or to develop the redefinitions of the critical problems of the period so significantly begun by Professor Heckscher.

Some years ago, Professor Clapham commented on the fondness of many theorists for "empty economic boxes." There are grounds for such a criticism. Historians, however, are subject to the converse danger: they suffer from "overcrowded economic boxes." Terms like "mercantilism" have exerted as mischievous an influence upon historians as the classification "miscellaneous" upon statisticians. It is tempting to throw all sorts of materials into such convenient boxes without ever really sorting them out. Such procedures distract our attention from the problems of historical analysis. We are not likely to have any adequate history of the economic thought or of the economic policies of the sixteenth and seventeenth centuries until the box labeled "Mercantilism" is discarded and the vast array of materials is sorted out and studied in new classifications with new judgments.

ABBOTT PAYSON USHER
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The Decline of a Cotton Textile City: A Study of New Bedford. By SEYMOUR LOUIS WOLFBEIN. ("Columbia University Studies in History, Economics and Public Law," No. 507.) New York: Columbia University Press, 1944. Pp. 179. $2.50.

This study of New Bedford's decline since 1920 is in considerable measure a straight statistical compilation. Most of the textual analysis contains little that is not a familiar story to anyone who has followed the history of New England cotton manufacture with any attention. Divided into three parts, the book sets forth, first, the situation as of 1939 in the industry as a whole and in New Bedford in particular, with a detailed examination of the resultant unemployment in this one-industry city; second, the reasons for the shift of cotton manufacture to the South, the basic cause of New Bedford's decline, and briefer explanation of contributing causes; and, third, the city's attempts to find solutions of the problem both by inducing new industry to locate in the city and by preserving the remnants of the old. Two of the three appendixes give considerable additional statistical data comparing the status of the New Bedford cotton industry with that of all the city's manufacturing enterprises, with all Massachusetts manufacturing, and with that of the whole United States. The first appendix consists of excerpts from the diary of the treasurer of New Bedford's first cotton mill, an unsuccessful venture of the late 1840's.

The whole short book is long enough to be deeply depressing in its stark factualness. The second chapter discusses in detail the unemployment situation in New Bedford as it existed in May, 1939. The figures largely tell the grim tale; no human anecdote creeps in to depict for the unimaginative the misery and despair of families unemployed two, three, and four years or more. But the facts need no elaboration, especially when one compares New Bedford's plight with that of cities of diversified industry where the depths of the depression by 1939 had long since lifted.

The analysis of the causes that brought New Bedford low, as stated above, includes nothing new to the student of New England industrial changes, but Wolfbein's treatment is judicious and backs up by specific evidence the generally accepted weighting of factors. It is of unquestioned value to have in one volume a series of carefully evaluated judgments of the relative importance of the advantages of the South in its cheap and docile labor and newer equipment and the handicaps of a city like New Bedford in regard to family management of its mills or high taxation. Although New Bedford as a one-industry city is in many ways unique, the conclusions of this study hold for many other New England communities.

I wish the author had injected more com-

ment upon the cotton mills that have survived in New Bedford. He alludes to the comparative success of several companies that switched from straight cotton goods to rayon, silk, and cotton blends. He points out that mills that concentrated upon fine goods fared better than those that succumbed in the early twenties to the temptation of entering the field of tire fabrics. But there is nowhere an indication of what permitted the two surviving yarn mills—the Kilburn Mills and the Quisset—to carry on where others failed. The Quisset is listed as having in 1928 only ring spindles of fifteen to nineteen years of age in its plant (see Appendix C, p. 166), just as was the case with most of its local competitors who vanished. And no data whatsoever are given on the Kilburn Mills.

Perhaps of greatest immediate value is the discussion in the last section of the book which deals with New Bedford's desperate efforts to rebuild a prosperous industrial community. The inducements held out to the clothing industry to set up in this city of unemployed and the consequent establishment of sweatshop wages by many of the city's new concerns is the most disheartening section of the whole sad book. But the warning is unmistakable and salutary. The valiant fight waged by the Industrial Development Legion of New Bedford indicates that good will and organized community action alone cannot provide an answer. Fortunately, the passage of state legislation in 1938 and later the federal Fair Labor Standards Act have ameliorated the situation of the mid-thirties. Only less discouraging is the account of the endeavors to keep for the city the dying cotton textile enterprises by the abatement of taxes and employees' contributions to the mills' tottering finances. The pitifulness of the workers' generosity in the struggle to save the cotton mills needs no highlighting. New Bedford's triple failure to find ways out of its difficulties—its meager success in attracting substantial new industry, its inability to salvage its old, and the impossibility of migration of the unemployed from the city during the country-wide depression—makes uncomfortable reading. But if the experience of this cotton-textile town as depicted by Wolfbein offers lessons to other communities to eschew complete concentration upon one industry only, the book will have served an important social purpose.

CONSTANCE MCL. GREEN
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The Structure of Soviet Wages: A Study in Socialist Economics. By ABRAM BERGSON. ("Harvard Economic Studies," Vol. LXXVI.) Cambridge: Harvard University Press, 1944. Pp. xvi+255. $3.50.

This volume is a carefully made investigation dealing with a narrow but important aspect of the structure of Soviet economy. It is concerned solely with the *differentials* in the earnings of workers in Russian industry. It presents, however, almost the first mass data available in English on the degree of inequality in the earnings of industrial workers in U.S.S.R. Moreover, it also makes possible a limited comparison between the inequality in earnings of American workers and those in Russia.

The volume begins with a brief restatement of wage theory in two chapters, which are simply an exposition of the process of rational proportioning of factors in an economic world and an argument that this process is not necessarily associated with any particular form of economic organization. In accordance with the argument the basic principles of economy apply under socialism as well as under capitalism. Chapter iii is a critical examination of the significance of money wages in U.S.S.R. in view of "free" income in various forms such as education and social services. An attempt is also made to evaluate the equalizing effect of the tax structure, social insurance benefits, and the rationing system. Chapter iv is a short exposition of the statistical procedure followed. The heart of the substantive findings of the volume appears in chapters v–x inclusive. Thus the inductive investigation is presented against a background of theoretical understanding.

An effort is made to measure the degree of wage variation in individual industry by using a simple coefficient of dispersion in the form of the ratio of the first and third quartiles of frequency distributions in which wage-earners are classified by earnings groups. The author himself recognizes the limitations in the data and procedure used. With all the limitations, the results obtained by the investigation are really striking. Comparison of the dispersion in the earnings of industrial workers in 1928 with that prevailing in 1914 shows a small but definitely measureable movement toward greater equality. Thus, looking at the quartile ratios, we find that in eight industries the 1928 percentages (Q_1/Q_3) are definitely higher in March, 1928, than in June, 1914. More specifically the

March, 1928, quartile ratio in cotton goods stood at 63.5 as compared with the corresponding figure of 57.8 in 1914. The greatest change appeared to have occurred in the leather and shoe-manufacturing industry, where the 1928 ratio was 53.7 as compared with 38.5 in 1914.

The author then makes a daring comparison between the wage differentials prevailing in thirteen industries of U.S.S.R. in 1928 with the differentials in the same industries of the United States in 1904. Although the difference in the dates is largely forced because of the availability of the statistics, an effort is made to describe the state of technology in American and Russian industry at these different times. Although such a description must necessarily be impressionistic, the evidence suggests that comparison of the wage structures may be relevant. It appears that, for the thirteen industries covered by this comparison, the state of technology in the industries of U.S.S.R. in 1928 was not markedly different from that prevailing in the United States in 1904. Indeed, for some of the industries it might have been preferable to have American data for some years even earlier than 1904. As a result of the comparison it is found that "the maximum difference in quartile ratios in the two countries is 5.4 per cent and the average difference is 3.2 per cent" in eight of the thirteen industries studied. For all thirteen industries taken together the average difference is 5.4 per cent. This is indeed an impressive result.

Another significant comparison is made between the quartile ratios in twenty-six industries for the period March, 1928, and in the same industries of U.S.S.R. for October, 1934. The average difference between these quartile ratios for all industries (disregarding sign) is 3.5 per cent, but the striking feature of the comparison is that the direction of the change between 1928 and 1934 is consistently downward. Thus, if these measures are reliable, the change in the wage structure of Soviet industry between 1928 and 1934 was definitely in the direction of an increase in the spread between high- and low-paid industrial groups.

There is also a chapter devoted to the comparison of the relation of the incomes of salaried employees with those of wage-earners in U.S.S.R. in 1928 and 1934. The summary figures of this comparison show the average earnings of salaried workers in twenty-six industries to be 172 per cent of the average earnings of wage-earners in 1928, while the corresponding figure in 1934 was 192 per cent. This is further evidence of the retreat from equalitarianism.

The basic summary of the volume is in chapter x, which appeared in print in a slightly modified form earlier (*Journal of Political Economy*, April, 1942). This summary chapter presents a series of Lorenz curves showing the distribution of the total computed wage bill among Russian industrial workers (large-scale industry only) in 1914, in 1928, and again in 1934. The final chapter conveniently restates the main conclusions of the entire volume.

Five chapters explain the principles of wage administration in the Soviet Union and present an interpretation of the extent to which the measures shown by the statistical review are a result of conscious policy. To some extent the shift away from an equalitarian system of wage payment takes the form of the progressive introduction of piece rates. Thus it was found that, in December, 1926, 59 per cent of the total hours worked in large-scale industry was remunerated on a piece-rate basis. In 1932 this figure had risen to 64 per cent, and by 1937 it had reached 72 per cent. The retreat from equalitarianism since 1931 is seen to be in part a product of the enormous demands for "qualified" labor arising out of the first Five-Year Plan.

The volume represents an objective analysis of significant but limited economic data, and the reviewer has been able to discover few points at which the language carries any emotional overtone. Although critical examination of the statistics would no doubt reveal substantial shortcomings, this is a volume which no economist, and certainly no economist interested in the remuneration of labor, can afford to overlook.

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Studies in Income and Wealth, Vol. VI. By the CONFERENCE ON RESEARCH IN INCOME AND WEALTH, NATIONAL BUREAU OF ECONOMIC RESEARCH, INC. New York, 1943. Pp. xiii+288. $3.00.

This volume, like three of its five predecessors, consists of a collection of papers relating to national income. Other than this, the seven papers have little in common except that they are all on a high level of competency. Their very variety, however, may make some one or more

of them of interest to almost any researcher in this general field.

As a by-product of their central purposes, three of the papers will be useful to anyone seeking a clearer knowledge of the details of national income concepts. John Lindeman discusses the effect of government operations upon measurement of the national income and proposes solutions for the problems which arise. His discussion (which classifies him in what may now be termed the anti-Kuznets school) illuminates the difficulties of defining aggregate social output in a system where production for market and the production of public services furnished to consumers and to business enterprises without the receipt of a *quid pro quo* are carried on side by side. Wendell Hance discusses the concepts of gross capital formation and capital consumption and then comprehensively and in considerable detail criticizes the adequacy of estimates available for estimating these totals. Rollin F. Bennett briefly reviews the relationship of international transactions to national income accounting. The body of his essay consists of a remarkably clean-cut analysis of the causal relationships between international transactions and the level of national income. He illustrates his excellent discussion with data from the United States.

Two other of the reports, by R. W. Goldsmith and E. W. Grove, deal with the development and use of specialized income concepts. Goldsmith probes into the measurement of the economic impact of war expenditures and refines the rather crude measures which were in use at the time he wrote. By way of illustration he applies one or the other or both of his two ratios—the current and the capital impact ratio—to data (now two or more years old) for major countries at war. He points out pitfalls in international comparisons. Grove presents a history and critique of the concept of income parity for agriculture. His discussion makes clear that advances in conceptual analysis, improvements in statistical data, and political expediency have each played a part in the development of the "parity" concept. His analysis is illuminating. It is unfortunate that he felt restrained from pursuing further various controversial aspects of the parity movement.

In a statistical study of income differences among communities, Herbert E. Klarman, using data from the consumer purchases study for nonrelief native-white complete families, concludes that differences in the level of family income among communities are significant but that income differences among geographic regions (i.e., in given-size communities) apparently are not. This fact will surprise and interest many economists. Mr. Klarman errs, however, when he suggests that fairly broad policy conclusions (e.g., concerning federal grants-in-aid to states) may follow from this fact. The generality of his conclusions is narrowed by the (perhaps unavoidable) elimination of data for other types of families. Equally important, though he notes that size of community is correlated with regional location, he fails to note that factors associated with regional location may therefore be among the factors causing differences in income levels. In any case, differences between regions in average income levels are certainly an indication of differences in economic ability.

F. H. Thomsen and P. H. Bollinger, practitioners of the art of forecasting national income and related measures, expose some of the secrets of the trade. Their demonstration gives impressive evidence of a state of affairs of which they themselves are well aware—the heavy dependence upon sheer empiricism, the subjective nature of many forecasts, and the consequent danger of rationalizing hunches. Various analyses published during the past several years have presented no satisfactory evidence as to the autonomous determinants of the level of economic activity. Perhaps this is because there are no autonomous and no induced components of private capital formation. Perhaps—the worst possible case for the forecaster—all or most are sometimes primarily induced, some also autonomous in part at times.

As in previous volumes, each essay is followed by criticisms by one or more members of the conference. The commentators frequently dissent vigorously from major or minor conclusions of the primary authors. I would concur in some of the dissenting opinions and would add an occasional one of my own. But the value of the papers to economists who have reason to be interested in the topics discussed is clear.

EVERETT E. HAGEN

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Federal Reserve System

Fluctuations in Income & Employment: With Special Reference to Recent American Experience and Post-war Prospects. By THOMAS WILSON. ("London School of Economics and

Political Science Studies in Economics and Commerce," No. 8.) London: Sir Isaac Pitman & Sons, Ltd.; New York: Pitman Publishing Corp., 1942. Pp. x+213. $3.00.

This stimulating little book is one of the progeny of the physical and spiritual wedding of the London and Cambridge schools—surely one of the happiest of war marriages. The reviewer's general reaction can be summed up by stating that, had the book reached his hands sooner, he would certainly have adopted it for his half-year seminar in business cycles. Not that Dr. Wilson's book is "textbookish"; it is, on the contrary, closely reasoned and attributes to the reader considerable knowledge of recent literature on economic fluctuations. Its use as a text would require a good deal of amplification by classroom discussion and supplementary reading, but it is clearly written and well organized. Most important, instead of the usual but anachronistic classifications of cycle theory into "types," it presents the sort of analytical integration and historical testing of available *tools* that is most useful at this stage.

In Part I he presents in 90 tightly packed pages a "Review of Trade Cycle Theory." Here are set forth the effects on income and employment of liquidity-preference and speculation, the multiplier, savings, consumption and investment, distribution of income, and credit scarcity. This section is not meant to be highly original, although Wilson's admirable simplification of "the modern theory of speculation" will undoubtedly seem original to readers who are unacquainted with recent British literature on the subject. The chief virtue of Part I is its avoidance of methodological and terminological disputes and its abandonment of the futile search for *the* theory in favor of gleaning the good from all current doctrines. A small and somewhat uncomfortable place is found even for Professor Hayek's approach: while an increase in consumption could never lead to a fall in total investment, it might lead to a reduction in *depth*, helping to explain why the increases in *width* do not produce increases in total investment as great as would be expected from the "relation" theory. The relationship between width and depth could bear more elaborate treatment, and some readers might welcome specific reference to the Clark-Frisch controversy.

While largely synthetic, Wilson's argument depends most on the thesis that the existence of speculative stocks of assets prevents changes in demand for them from altering interest rates, so that adjustment takes place through fluctuations in income instead. Wilson's own "model" in chapter x is not, as he claims, "self-generating," depending on the assumption that "investment is ahead of savings" in the first place; and the importance of inelasticity of expectations in his explanation of turning-points leaves the reader a trifle dissatisfied. However, Wilson does not insist upon acceptance of this model but presents several alternative explanations, to be tested in Part II.

Part II is devoted to "Cyclical Fluctuations in the U.S.A. 1919–37." The amount that can be said in 94 pages about this crucial period in American history is naturally limited, and Dr. Wilson has selected his material well. More use of monthly data and more careful attention to lags would have helped. He argues, for example, that the underconsumption explanation does not apply to the early twenties, since an increase of consumption by 5.8 per cent between 1923 and 1924 was accompanied by a rise in income of 1.2 per cent, while a decrease of 1.2 per cent between 1924 and 1925 was accompanied by a rise in income of 4.6 per cent. Surely the rise in investment, and so in income, during 1925 could be due to the rise in consumption in 1924? Moreover, in 1926 income rose only 5.6 per cent, despite a rise in consumption of 7.9 per cent. Thus, investment must have fallen, perhaps because of the drop in consumption in 1925. Given a one-year lag, instead of the "dogmatic underconsumptionist" having "no small difficulty in explaining this fact," he would find the facts fitting his thesis very well.

In his final chapter Dr. Wilson sets forth "Some Conclusions and Suggestions for the Control of the Trade Cycle after the War." He confesses that "the explanation of the events in the preceding section must remain largely a matter of mere conjecture," but he quite properly believes that "the theories reviewed in the first part were far from useless in attempting some sort of interpretation." He concludes that his investigation of American business cycles

> has thrown some light on the theories of credit scarcity and even of wage policy; it has served to indicate the importance, as well as the limitations of the theory of underconsumption; and it has emphasized the significance of long-period building booms, changes in stock of equipment, and changes in technical progress.

For the postwar period, he eschews wage policy and feels that public spending is limited by the need to reduce debt occasionally—for

undisclosed reasons. Therefore, "the obvious remedy lies in periodic capital levies." Even those readers who guess that his capital levy, like Kalecki's, would apply to cash balances, and thus become a tax on hoarding as well as on investing, may not agree that the remedy proposed is "obvious." Do we want to discourage *investment*, or only hoarding? If only hoarding, a tax on liquid assets, perhaps with rates progressing with degree of liquidity, would surely be a better device. The emphasis on "stocks of capital" suggests that Dr. Wilson may want to discourage investment too; but, if he does, his reasons need a more complete statement than is provided in the book under review.

BENJAMIN HIGGINS
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The Financing of Large Corporations, 1920–39. By ALBERT RALPH KOCH. New York: National Bureau of Economic Research, Inc., 1943. Pp. xv+139. $1.50.

This statistical study is one of a series prepared under the Financial Research Program's Business Financing Project designed to trace structural and cyclical changes in the financial organization of business since 1900, to determine business credit demands in recent years, and to describe the adaptations of financing institutions in supplying short-term and intermediate credits in the past decade.

This particular study follows the lines of the "Source and Application of Funds Analysis," which is primarily a study of balance-sheet changes from year to year rather than just the "financing," which would imply interest exclusively in the liabilities that represent the sources of business funds. The material, except for that on the railroads, and the American Telephone and Telegraph system, consists of samples of major corporations in the manufacturing, trade, and electric-light and power fields.

The relative importance of the manufacturing and trade sample, which is given the greatest attention, is analyzed (p. 13). The sample included 29 per cent of all manufacturing corporation assets and 8 per cent of all trade corporation assets (1933). The reader will also do well to keep in mind that the sample is heavily influenced by a few large companies. General Motors, Standard Oil of New Jersey, and United States Steel held 33 per cent and 27 per cent of the assets in the sample in 1921 and 1939, respectively. Similarly, Woolworth, Montgomery Ward, and Sears, Roebuck held 64 per cent and 53 per cent of the trade-company assets. (Calculated from Appendix A.)

The analysis covers fixed capital expenditures ("plant and equipment" and "investments in subsidiaries and affiliates"), current assets (inventory, receivables, cash and marketable securities), short-term financing (notes payable, accounts payable, other current liabilities), funds retained from operations (undistributed earnings, depreciation accruals, "other funds"), and stock and bond issues.

Plant and equipment expenditures are shown by major groups (rails, electric, telephone, manufacturing, trade) over the period 1921–39, and some explanations of their cyclical fluctuations are offered. The ratios of these figures to depreciation indicate how far capital recovered from these charges was able to carry the burden of such expenditures. A further comparison of these expenditures is made with sales.

Annual current asset changes for the manufacturing and trade groups are charted, as well as the amounts and percentage proportions of various current assets. These are followed by analysis of the particular current assets for the subgroups (textiles, chemicals, etc., and mail order, chain groceries, etc.).

In the chapter on short-term financing (current liabilities), special attention is given to the changing place of bank credit (notes payable), as well as to a survey of the amounts and proportions of the three divisions—notes payable, accounts payable, and other current liabilities. The review of funds retained from operations covers the percentages of earnings retained by the several manufacturing and trade groups, and the cyclical history of depreciation allowances taken as percentages of sales. The chapter on security markets is largely concerned with the volume of securities issued and retired by the major corporate divisions and the importance of those sums as related to funds retained from operations and short-term financing.

Although this brief work is brightened by more than a score of charts and has numerous tables, none of the former is supported by a data table. The Preface promises that a data book will be made available eventually. Something of the same desire for brevity appears to have limited explanations of procedure to the point that the meaning of some of the data is not always clear to the critical reader. For ex-

ample, reference is made to replacements of fixed property (p. 27), and the implication is that they are included in the totals of fixed property expenditures. However, except for the steam railroads, data on *gross* plant expenditures were rarely reported even by major corporations until recently. Only the *net* increase could be had from the reported balance sheets, although a portion of the difference between the gross and net figures could be inferred from changes in the depreciation reserves. Under the circumstances a rather exact statement of methodology is essential before the material can be used by the reader with assurance as to its meaning.

A similar question arises as to fixed capital expenditures for investment in *subsidiaries* and affiliates. The accounts of subsidiaries are normally consolidated so that expenditures on subsidiaries are not ordinarily distinguishable from those of the parent-company. Yet the author states that "the large volume of expenditures on subsidiaries by large manufacturing corporations in 1923 was mainly due to the acquisition by Bethlehem Steel Corporation of the Lackawanna Steel Company" (p. 37). Aside from the facts that Lackawanna was acquired in 1922 and that the large 1923 increase in Bethlehem assets was the result of the acquisition of Midvale Steel and Ordnance Company, a study of both *Moody's* and the annual report to stockholders shows the acquisition reported only in a *consolidated* balance sheet so that the properties appear as operating assets, fixed and current, rather than in an investments account.

A clear-cut indication of methodology and adjustments is essential before statistics of this type can be used intelligently. Moreover, because few individual companies are so large, the reader cannot assume that errors or differences in ideas about classification will be compensating or unimportant. One recalls that Allied Chemical and Dye Corporation reported marketable securities in 1932 of $92,404,341 but in 1933 marketable securities and United States obligations of $60,428,414 *and* Treasury stocks of $31,477,785. How was such a case handled in this study?

Some of the loose terminology will disturb the critical reader, such as the use of "consolidation" (p. 39) to include combination by the holding-company device, the use of "working capital" (p. 42) to mean current assets rather than their excess over current debt, and the reference to "dividends and other expenses" (p. 76). Certain of the conclusions and interpretations will also be questioned in spite of the prefatory statement that "the analysis is meticulously factual, and the conclusions have been objectively and impartially drawn" (p. ix), in such cases as: "This Act [Transportation Act of 1920], with its 'recapture clause,' induced high-earning, low-capitalized roads to combine with low-earning, high-capitalized roads." "Recapture" never became effective and was finally repealed after being declared unconstitutional in the St. Louis and O'Fallon Railway case.

Some of the difficulties suggested here may be explained by the author's entry into the statistical office of the Army Air Forces before he was able to bring his study to publication, and it is to be hoped that a later revision of such potentially valuable data may be forthcoming. Tabulations of supporting data and clarification of definitions and procedures would widen the usefulness of the work. Extension of the study to cover the current war years would also enhance the utility of the material for both business and general economic analysis.

HARRY G. GUTHMANN
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Student Folkways and Spending at Indiana University, 1940–1941: A Study in Consumption. By MARY M. CRAWFORD. ("Columbia University Studies in History, Economics and Public Law," No. 499.) New York: Columbia University Press, 1943. Pp. 271. $3.50.

This volume reports the results of an investigation of the expenditures of 1,275 undergraduate students at Indiana University. The data are estimates made by the reporting students on schedules distributed and returned in February, 1941. Thus they are in part estimates of what the student had spent, based on records or memory, as the case might be, and in part estimates of what he expected to spend during the remainder of the period. For all items except clothing, the amounts are those spent during the college year—September, 1940, to June, 1941. The clothing figures, the author says, "tend to represent a budget for twelve months rather than for the thirty-six weeks in the regular academic year." Strictly speaking, the averages for clothing are not "expenditures" even for a twelve-month period. The price paid for a garment which the student expected to wear for more than the current year was divided by the

number of years the student expected to wear it. One gathers indirectly, from one sentence in the text, that a part of the price paid for similar articles previously purchased was added to the clothing outlay during the period. No copy of the schedule is given in the published report.

The results of the investigation should be of special value to college administrators or to anyone interested in adding some significant details to his picture of the young men and women who attend American colleges and universities and of how they live while there. The median and quartile amounts spent for all purposes and for fourteen categories of expense are given for the whole group reporting and for the group variously classified. The major bases for classification are: sex, "organization" (membership in fraternity or sorority), school of enrolment, college class, and location of home—whether farm, small town, or city. The author also attempts to discover variations in the amount spent for certain purposes with the type of living arrangement at the University, the percentage of expenses earned, and academic standing. The mean is used only as a basis for calculating the percentage of the total spent for various purposes.

Was there anything characteristic about the spending of these students? There were obviously certain "musts" among their expenditures, because they were students. The author compares their spending pattern with that of the "average single person" as estimated by the National Resources Committee for the year 1935–36. It would have been desirable, in the reviewer's opinion, to have compared their outlays also, wherever possible, with those of persons of similar age and marital status living in various types of North Central communities in 1935–36, as reported in the Consumer Purchases Study. The two factors that clearly made a difference in the pattern and amount of expenditures were sex and organization—so great a difference that, where these variables were not controlled, one must reserve judgment as to other relationships. The clothing expense of the women far exceeded that of the men. The difference was so great, in the case of organized women, as to offset larger expenditures by men for other purposes and to bring the median total expenditures of women above those of men. This divergence in the expenditures of men and women is not peculiar to students but is found among nonstudents of similar age and marital status, as shown by other studies. Organized students, both men and women, spent more for most items than unorganized; and students from urban communities, more than those from farm homes. It is probable that these differences reflect in the main differences in parents' incomes, expenditures varying in the usual manner with ability to pay.

In the reviewer's opinion, the value of the study, viewed simply as what it is—a straightforward description of the spending ways of a sample of university students clearly and interestingly written—would have been enhanced by a few additions. One is the notation, at appropriate places in the text, of what appears in an appendix table—the overweighting of the sample with women and with unorganized women. Another is a more adequate discussion of the method of securing the data and the instructions given to those making the estimates. The author discusses the known deficiencies of unsupervised record-keeping for a short period; but she says nothing of the possible limitations of the questionnaire, used in her study, as compared with the schedule filled out by a trained interviewer. Nowhere does she discuss the unique feature of her study—the reliability of estimates of future spendings. Nor does she discuss possible differences between averages for clothing expense, as computed for this study, and those based on the actual outlay during the period. What are needed are studies in consumption that set new problems or develop new procedures. The purpose of each study should be specifically stated, both what the investigator hoped to attain and what he did actually attain; and no enlightening aspect of the methodology used should be left obscure.

HAZEL KYRK

University of Chicago

War-Time Pattern of Saving and Spending. By CHARLES MADGE. ("Occasional Papers, IV, National Institute of Economic and Social Research.") Cambridge: At the University Press; New York: Macmillan Co., 1943. Pp. viii+137. $1.50.

This very interesting report is the work of an anthropologist supported by a "supervising committee" including Professor Bowley, Lord Keynes, and Mr. Geoffrey Crowther. It embodies a quantitative analysis of working-class savings, based on a series of field studies in a succession of British cities. Statistically speak-

ing, these studies must be viewed as explorations rather than clear-cut tests of definitely framed hypotheses: the author and his interviewers were continually adjusting and improving their methods not only between studies but within the study of each city. The resulting lack of standardization gives the findings a lower rating in terms of formal "validity" than those reached in such studies as the American *Survey of Spending and Saving in Wartime;* but the author's two years of living with the problem, data, and methods have equipped him magnificently for interpretation. Much of the appearance of statistical weakness, furthermore, arises from the author's frankness in taking the reader behind the scenes, where every field study may be seen at its worst. By accepted rules of presentation it would have been entirely legitimate to suppress the fact, for example, that in the Leeds study a group of these interviewers completed successfully only 315 (47 per cent) out of the first 672 interviews attempted, but 400 (63 per cent) out of the last 632.

The most striking quantitative result of the studies is the high concentration of war savings, even within the working class, in a small proportion of families. A table for Leeds (p. 51) shows that, leaving out of account industrial insurance, pension funds, union dues, sick clubs, installment payments of debts, and currency hoarding, 44 per cent of the working families in 1942 were making no "national savings." The 3 per cent of families saving over 25 shillings weekly accounted for 31 per cent of aggregate savings, and the 6 per cent saving 10–25 shillings a further 25 per cent of aggregate savings. The author himself presents reasons for doubting the representativeness of these specific figures; but the case for a high concentration is very strong from his studies of savings in other cities and a supplementary analysis of wage-earners' savings-bank accounts. The most important selective factors putting savers in this élite group of large savers are high income and small family; but other factors are important enough to give surprisingly low coefficients of correlation (p. 138) between income and war savings within groups of families of like composition—only three groupings out of thirteen showing coefficients higher than 0.60. Among these other factors are strength of will and rural origin, according to Glasgow data presented in Appendix II. There is little evidence of a direct influence of patriotic appeals or wartime savings propaganda; on the other hand, 18–42 per cent of working families were in "Savings Groups" (the equivalent of our pay-roll savings plans), and about 30 per cent more were putting aside savings than before the war, representing nearly a doubling of the proportion of families saving. Fear of postwar dislocation is clearly a factor with some; but with others it is actually a deterrent to saving, past experience with "means tests" having led to a suspicion that the family with savings simply gets less relief in a slump. The author's primary explanation of the wartime bulge in savings is that "at its present stage of development, the working-class will to consume has a roughly defined upper limit" (p. 73). The great deficiency of the analysis is the author's lack of sensitivity to the importance of changes in income; nowhere is size or recency of income increases made a basis of tabulation or even inquired about in the questionnaires.

On the side of procedures, the author found (as might be expected) that there was no difficulty ascertaining in what ways people saved from casual inquiries, but that to find how much they saved (except for certain weekly items) required putting together fairly complete accounts of income, expenditure, and changes in assets, involving interviews lasting hours. Twenty-four interviewer-months in Leeds went into 715 successful interviews (including 102 budgets), 369 partially successful or incomplete interviews, 719 other contacts (refusals and non-working-class families), and 276 wild-goose chases after "unobtainable" cases. Most items of expenditure were taken for the week preceding the interview (a record for the two succeeding weeks being substituted if the interviewee after questioning agreed to keep a budget), clothes for the preceding week in the first half of the Leeds interviews, the preceding six months in the remainder. Contrary to American field experience, income came out fairly uniformly in excess of the sum of savings and expenditures—a result which may be a testimonial to the care used in checking income against wage rates and hours worked, or to the fact that clothing expenditures corresponded to a lower previous income level, or to incomplete reporting of savings. The most interesting feature of the inquiry is the separation of the pocket money of the husband and supplementary earners and the housekeeping money of the wife; the relatively high proportion of unsuc-

cessful interviews, by the way, reflects largely insistence on measuring both. These measurements are supported by a most interesting analysis of stresses and strains within the family as consuming unit, which will be profitable reading for students of economic theory.

A. G. HART

Chicago, Illinois

Elements of Statistical Method. By ALBERT E. WAUGH. 2d ed. New York: McGraw-Hill Book Co., Inc., 1943. Pp. xxi+532. $4.00.

The author of this book stated in the Preface of the first edition:

> This book is planned for the beginner in the field of statistics who has yet to learn "what it is all about." No attempt has been made to treat any aspect of the field exhaustively. . . . .

In the Preface to the second edition he writes:

> One of the most difficult problems in writing any elementary textbook is to keep it truly elementary—to write for beginning students rather than for one's colleagues. . . . . Much of the new material in this revised edition has been inserted at the request of other teachers who use the book. . . . .

It appears that Professor Waugh has reluctantly yielded to the demands of the trade, but he tries to delude himself and his readers into believing that he still has an elementary textbook. The reviewer believes that the author would have done better to have written a second volume or an advanced textbook, instead of revising the elementary one. For example, it is difficult to believe that an explanation of the Pearsonian system of frequency curves, an illustration of fitting a skewed Type III curve, and a discussion of and a fitting of a Poisson series belong in an elementary textbook. The beginning student who wades through these parts of the book will be surprised to find later on in the book the statement that a straight line is "one with no bends"! Even in the first edition, the author "assumed that the reader has a good command of college algebra." This is even more necessary for the revised edition, which is more suitable for graduate students or Seniors than for Freshmen or Sophomores.

For mature college students the book will serve well to cover the usual subjects if the professor chooses the assignments wisely and helps the students over the advanced parts or eliminates them. In the limited space available the reviewer must usually point out some of the disadvantages which he believes exist in the book. Waugh makes frequent use of the probable error, which is a vanishing practice in modern statistical methods. The reviewer does not like Mr. Waugh's phrase "chance is ruled out" when the probability of an event's being a random fluctuation is small enough to permit us to accept the event as reliable evidence. Chance is never really ruled out. Waugh also states: "Odds of 40 to 1 are not certainty to a statistician." A good statistician does not and should not require certainty, nor should he spend his time searching for certainty.

The author is an optimist. Only fourteen pages after he begins to explain the method of least squares in the measurement of secular trend, he states: "By now the method of least squares should be second nature to the student, and a very sketchy description of the method of fitting a geometric trend, or semilogarithmic curve, should suffice." The teaching of students who learn this rapidly would really be a pleasure. Most students have to do quite a bit of statistical work before the method of least squares becomes second nature. On page 255 Mr. Waugh repeats McCall's suggestion (made in 1923) that in computing standard errors of the mean and standard deviation "we use $N - 1$ in place of N when the number of cases is between 20 and 30, that we use $N - 2$ instead of N when the number of cases is between 10 and 20, and that we use $N - 3$ in place of N when N is less than 10." Waugh does not present any reason for, or proof of, this unorthodox practice of using $N - 2$ and $N - 3$ in the computation of the standard error of the mean. This fact, coupled with the absence of any explanation of the concept "degrees of freedom," makes the book less satisfactory for a modern approach.

The reviewer strongly disapproves of the author's apologetic presentation of statistical method as "a poor second choice" (p. 3), adopted with reluctance because

> it is often impossible to make use of the experimental method. . . . . Under ordinary circumstances this method is much more difficult than the experimental method, and the results obtained are usually less accurate and less satisfying. But they are much better than no results at all [pp. 3–4].

On the contrary, there are many cases in which the statistical method is superior to the experimental method, and statistical analyses have

revealed weaknesses in the experimental method by detecting a lack of control where there was assumed to be experimental control.

The reviewer noticed a few errors. On page ix, line 30, substitute "XIV" and "XV" for "X" and "XI"; on page 207, line 29, "σ_4" should be "σ^4"; on page 245, line 9, the "3" should be a subscript to the subscript instead of an exponent; on page 332, line 18, the word "without" should presumably be replaced by the two words "with our"; on page 398, line 19, a prime should be added to S_y; on page 363 the word "cents" should be added to the heading of the table.

HARRY PELLE HARTKEMEIER
University of Missouri

An Introduction to Managerial Business Statistics. By HARRY PELLE HARTKEMEIER. New York: Thomas Y. Crowell Co., 1943. Pp. xiv+207. $1.75.

This is the first of a projected series of four textbooks on business statistics for college and university students. The subjects discussed in the present volume are the t-test of the difference between two sample means, the F-ratio for testing the difference between two sample standard deviations, the interpretation of tests of significance, the handling of significant figures, the χ-square tests of goodness of fit and independence, and production control by the use of charts of sample means and sample standard deviations. Averages, dispersion, the normal distribution, and degrees of freedom are discussed briefly and incidentally in connection with the t-test.

The format is interesting. The text material is printed in large 14-point type on $8\frac{1}{2} \times 11$-inch sheets, paper bound, with perforations for insertion in three-ring binders. At the end of each of the five main chapters are several problems (from two to ten per chapter) and some excellent charts and tables, including completion sheets for use in solving the problems. There are also a table of the F, t, and χ-square distributions at the 5 and 1 per cent levels, a table of areas under the normal curve, and a table of squares, square roots, and reciprocals of the numbers 1 to 1,000 (inadvertently shown as 000). At the back of the book are eight sheets of cross-section paper ruled about nine to the inch. The advantages of these features for laboratory work are obvious.

The text is usually clear and simple, in nontechnical language, with a minimum number of formulas. At times, however, the presentation is inadequate or objectionable. There is a careful explanation that probabilities based on the normal curve do not apply exactly to a discrete distribution; but other possible departures from normality, such as skewness, are ignored. While it is evident that the author uses the symbol σ_M to represent an estimate of the standard deviation of sample means, his assertion that "more than 5 per cent of the area under the distribution of means based upon 15 observations lies beyond $\pm 2\sigma_M$" may cause confusion, nevertheless. The formula $\sigma_y = \sigma/\sqrt{2N}$ is given without qualification as to size of sample. The steps in testing a null hypothesis and the conclusions to be drawn are very well outlined in the chapter on this subject; but in several places in the book the conclusions are ambiguously or incorrectly stated. For example, the statement that

> a business statistician who uses the 5 per cent probability point as a criterion in solving practical problems would be right in 95 per cent of the decisions he makes if he solves a large number of problems which yield values that fall approximately at this point

is poorly conceived. The use of the t-distribution to establish significant points on production control charts is technically incorrect for sample standard deviations, and also for sample means when the variance of the controlled product is specified, although the resulting inaccuracies would be negligible in large samples.

Most objectionable are the author's eccentric views about the statistician's place in the business world. We read, for example, that "accounting is nothing but classification, which is the simplest kind of business statistics summary or report known," and that "most of the problems of production and business management can be solved by the application of statistical methods." Such views are not widely held even among statisticians, and their exposition should not be required reading for college students.

Professor Hartkemeier has introduced several ideas that should prove helpful in teaching elementary statistics, but considerable revision is needed to make his book suitable for the purpose intended.

HOWARD L. JONES
Chicago, Illinois

Wage Determination under Trade Unions. By JOHN T. DUNLOP. New York: Macmillan Co., 1944. Pp. ix+231. $3.50.

The title of this book is considerably broader than its contents, for Dr. Dunlop treats of announced union wage policies rather than of the effects of unions on wages. The point would not be worth mentioning in this day of irrelevant titles were it not for the considerable evidence in the literature that many labor economists believe that union proceedings and journals can answer the broader question. But this is not an appropriate place to enter the ancient feud between "general" and labor economists, especially since the reviewer is in the uncomfortable position of finding Dr. Dunlop's work alternatively too empirical and too "theoretical."

Empirical studies of two types fill two-thirds of the volume. The first type consists of surveys of union wage policies, and they are to the reviewer the most interesting portions of the book. Nonincome objectives of unions, make-work policies, and union attitudes toward cyclical flexibility and interenterprise wage differentials are sketched in chapter iv. A less familiar subject is the attempts by unions to influence the demand for the products of their industries and to regulate production and fix prices and terms of sale (chap. vi). Scattered materials on these subjects have been brought together in a systematic and informative way, and these chapters form a welcome supplement to Slichter's *Union Policies.*

Three statistical studies complete the empirical work. The first is a lengthy comparison of ratios of wages and wages-and-salaries to various measures of national product; neither the purpose nor the significance of this comparison is evident. The second study deals with wage-rate changes during the great depression. Here it is argued that product prices, not unions or unemployment, determined the extent of wage reductions (p. 146). Since no data are given on extent or strength of unions, price changes, or unemployment—and very little on wage rates—most readers will be unwilling to accept this strange conclusion. Moreover, for this question one should compare wage rates with cycles in specific industries, not with those in general business. The third statistical study collates data on labor costs as a percentage of receipts (from the *Census of Manufactures;* so the ratios are sometimes greatly affected by intra-industry sales, etc.), physical output, and labor productivity in thirty-seven manufacturing industries. Again it is left for the reader to distil what generalizations he may.

There remain two chapters on formal theory. The first is a suggestive analysis of the wage policies which will be adopted by a union which maximizes the wage bill, the wage bill plus unemployment relief, etc. The great difficulty in such analyses is to define a significant supply curve (which with some justification is called the "membership function"). The supply curve cannot even be taken to be positively sloping in general: one important way to drive members out of a union is to set wage rates which decrease employment. The list of factors which determine supply seems reasonably complete (pp. 32 ff.), but Dr. Dunlop does not take the more difficult step of indicating curves appropriate to typical unions.

The chapter on bargaining power is less instructive. Bargaining power is defined as the actual wage paid minus the supply price of the quantity of labor hired which would rule under pure competition "in all relevant markets"—all divided by the demand price (for that quantity of labor) which would obtain with pure competition, again "in all relevant markets." (In practice "all relevant markets" means the market for the product of the industry, ignoring other labor and commodity markets.) Bargaining power is thus a measure of *every* departure from a perfectly competitive equilibrium. The notion is obviously too vague to permit of real analysis, let alone of measurement. The discussion is conducted under very restrictive but ambiguous assumptions, and the technique is rather pedantic.

In any case, no single measure of monopoly power or bargaining power is very useful, for a reason which the author rightly emphasizes in another connection (p. 46): price is only one of the variables—although rightly the most strategic—of economic analysis. A monopoly can show its power by quality degradation, underinvestment, support of overinvestment, suppression of new products, excessive wage rates, inadequate wage rates, etc. There is no reason to believe that these and other modes of exploitation can be measured by the difference between marginal cost and price or, in the present case, between two wage rates. There is also some doubt about the appropriateness of a definition of monopoly power in terms of marginal quantities.

A final chapter contains Dr. Dunlop's articles of faith. He expresses grave doubts of the efficacy of the impersonal market in achieving an efficient and equitable economic system, unfortunately without making any detailed comparisons with practicable alternatives. The war experience with planning is cited in favor of central control. It would seem to be equally, and no more, appropriate to say that the case for central control should not be condemned merely because of our current experience. He concludes by expressing widely shared fears of the consequences if powerful unions pursue narrowly defined self-interests.

GEORGE J. STIGLER
University of Minnesota

Effects of Taxes upon Corporate Policy. By NATIONAL INDUSTRIAL CONFERENCE BOARD, INC. New York, 1943. Pp. 136.

This is an investigation into the manner in which federal corporation taxation influences the decisions of corporate management. The study is based on questionnaires, of which 1,325 were sent out, with 266 answers received. The replies are worked into the text of the report as providing supporting or contradictory evidence for various propositions advanced and are also quoted extensively in several appendixes. Although the comments on the questionnaires cannot, by any means, be taken as providing definitive conclusions, they alone are worth any time spent on the report, because they provide a feeling of the complexity and variety of the circumstances in which the tax factor plays a role in the decisions reached by business management.

The chief topics emphasized in the study are the effects of taxation upon expansion and production, upon price policies, and upon inventory and other lesser policies. Attention is given also to the possible effects of various alternatives to present methods—particularly to the use of corporate taxation as a withholding device and to the elimination of corporation taxation with individual stockholders taxed directly on their attributable shares of corporate income.

The text of the study stresses the apparent importance of the "security" motive in business—that is, the concern over any policy which jeopardizes the future of a concern and the reluctance to embark upon action when a tax situation makes such action more dangerous. This, it is pointed out, is somewhat broader than the usual profit theory of motivation, in that survival, or the avoidance of the ultimate results of losses, is substituted for gain as a chief goal. The principal recommendations arising from the report are for more adequate provisions to offset losses against gains and thereby tax only long-run net income, preferably through some provision for contingency reserves, and for the abolition of corporate taxes, with the substitution of one of the two alternatives mentioned above. The opinion expressed on this latter point is rather indecisive, since many valid objections are recognized in each case.

The use of questionnaires calling for rather general statements on broad controversial matters probably gives much less satisfactory results than would a detailed recapitulation of the factors entering into specific decisions on individual problems. On certain topics, notably the effects of taxes on prices, the answers too often approach the reassertion of dogmas based on unrecognized premises rather than a thoughtful appraisal of the issues involved. But the dogmas themselves are, of course, significant if sufficiently widely held. The comments in this section, incidentally, provide several interesting contrasts to the study of the effects of taxes on price policies made by the Conference Board some years ago. The reviewer's comment on the questionnaires and answers is made to point out limitations rather than as a criticism. The basic idea of trying to find out how taxes affect policy by going to those who make policy, instead of by deductions about how "logical" men might be expected to act, is sound. We need many more and many different types of application of this approach.

DAN THROOP SMITH
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Harvard University

The Economics of Soil Conservation. By ARTHUR C. BUNCE. Ames: Iowa State College Press, 1942. Pp. xv+227. $3.00.

The application of the classical theory of economics to soil conservation provides the core to *Economics of Soil Conservation*, and it is in this phase of the book that the author makes his greatest contribution. Individuals associated with current soil-conservation programs will find the explanation to many of the

farmers' responses to soil conservation in the principles developed in this book, even though they may not find many answers to their questions.

The first part of the book is devoted to definitions of terminology and to concepts used in the analysis that follows. This makes for somewhat of a formidable beginning to those not attracted by economic theory.

The second part of the book deals with the application of economic theory to soil conservation. This section contains the heart of the presentation. The author develops the many possible economic adjustments that may take place when great areas of land are shifted from exploitive farming to fertility maintenance. He likewise discusses the factors of production and their relationship to conservation and points out the relative abundance of land and fertility as compared to labor and capital in the early stages of settlement in this country. How differently the same changes in prices and costs of production affect conservation practices in different areas is clearly presented. Attention is called to how efforts to support the price of soil-depleting crops may encourage soil conservation in some areas while furthering depletion in others.

The distinction drawn between fertility depletion and soil deterioration in chapters vi and vii adds to the clarity of the publication. In connection with the discussion on soil maintenance the question might be raised of whether the maintenance of soil fertility at the expense of the depletion of certain of our mineral deposits is really social conservation. The implication in these chapters seems to be that it is; yet, if the deposits are used liberally today, they will not be available in the future when they may be needed much more.

In the last part the author treats such phases as social control over land use, problems of measurement, war and conservation, and the formulation of national policy. Although many concepts are mentioned, this section lacks the penetrating analysis that might be anticipated in the light of the first part of the book. Under the challenging chapter heading of "The Formulation of Public Policy" the author escapes the task of analysis by calling for a Federal Department of Conservation and an action program guided by a vigorous research program.

The attitudes and actions of many individuals associated with soil-conservation programs indicate the need for greater recognition of some of the principles discussed in the first part of this book. Students of soil conservation will find it a book with which they will want to be familiar.

J. CARROLL BOTTUM
Purdue University

Consumer Problems in Wartime. Edited by KENNETH DAMERON. New York: McGraw-Hill Book Co. Inc., 1944. Pp. xi+672. $3.75.

In the thirty-one chapters written by twenty-five experts in the fields of marketing, economics, and home economics, many aspects of consumers' problems in wartime are covered. In fact, the material ranges from discussions of inflation, rationing, taxation, and investment to a description of how to play the "good quiet" game of ghost.

In addition to the above, six chapters deal with "The Marketing System and the Consumer." Government agencies and how they aid consumers are covered in two chapters. Sixteen chapters are devoted to "Consumer Skills and Their Application to Specific Goods." These include chapters on household management, care and use of consumers' goods, health, nutrition, buying foods, housing, household equipment and furnishings, textiles and clothing, personal care, automobiles, and recreation. The first chapter, "Consumer Education in Wartime," is certainly much out of place as an introductory chapter and provides a poor approach to the book.

In spite of the difficulties of dealing with so many different subjects and of molding the contributions of so many persons into a homogeneous whole, the editor has succeded in producing a readable book in quite a uniform style. There is some repetition which in all probability could not be avoided. On the whole, the emphasis on the wartime aspects of consumers' problems has been uniformly held throughout.

Because of the diversity of topics covered and differences in approaches used, it is impossible in a short review to evaluate each contribution. The editor, who is responsible in all for seven chapters, gives the reviewer in these chapters an impression of partiality toward advertising and business in general. This idea is conveyed not so much by direct statements as by repetition of points which place market agencies and practices in a favorable light and by omission, or sometimes undue expansion, of

discussions of subjects pertinent to consumers. To cite one example—eight criticisms of advertising are listed (p. 173), but only one is discussed, while others equally or more important to consumers are dismissed with a few sentences.

Although there is much important material in the chapters on standardization and labeling of consumers' goods, the discussion seems to confuse rather than to clarify the issues involved in the controversy regarding grades, brands, and other suggested methods of labeling. The treatment of "descriptive" and "informative" labeling is especially confusing. Moreover, those who have studied grade labeling will disagree with the statement that "the consumer may choose .... between brand marks and grade designations" (p. 170). Goods on the market today with grade designations also carry brand names. There is nothing about grades to prohibit or discourage the use of brands on the same label.

Although this book is a contribution to the literature dealing with consumers in wartime, it is doubtful if it will appeal to as many groups as the editor indicates in the Preface, where he states it may be used by homemakers, by business, or as a textbook for adult groups, senior high schools, and senior colleges. The reviewer wonders if by aiming at so wide an audience some at least of its usefulness to any one group may not have been lost.

JESSIE V. COLES

University of California
Berkeley

Theodore Roosevelt and Labor in New York State, 1880–1900. By HOWARD LAWRENCE HURWITZ. New York: Columbia University Press, 1943. Pp. 316. $3.75.

Frequently the subject chosen for a Doctor's dissertation is too limited to yield an adequate amount of material. There is not much pay dirt in mining the early career of the first Roosevelt to dig up his views on labor. Theodore Roosevelt, in the period covered by this study, seems to have been an ordinary run-of-the-mine politician with a flair for splenetic utterance. There is nothing in the record to show that his views were either novel or especially perceptive.

He had little affection for labor unions and looked upon them with mistrust. As he became more experienced politically, he learned to moderate his public statements; but privately he manifested the same animus. While governor of New York, he was very quick to send the national guard to communities experiencing strikes or lockouts. His action was always justified by the need to maintain the sanctity of the law. As a member of the legislature, he sometimes supported the milder type of labor legislation, but usually on humanitarian grounds and not because of a desire to win labor's political support.

A study of the labor opinions of Theodore Roosevelt in the period 1880–1900 must, by the very nature of the material, be a dull compilation of the commonplace opinions of a shrewd and rising politician. The author has, however, refused to be hampered by the subject. He has used the labor views of the first Roosevelt as a vehicle for describing the New York labor scene. A large mass of material on labor conditions, labor legislation, and the labor movement has been skilfully assembled from which the reader can gain much information and insight. The author shows that the rather primitive welfare legislation designed to remove the more shocking industrial evils encountered opposition as vigorous and as vocal as the more advanced legislation in our own time. Typical and almost amusing is the quotation from the argument of one of the more shining ornaments of the American bar, William Evarts, who was convinced that not only was the prohibition of the manufacture of cigars in tenements in New York City an interference with private property and personal freedom but it prevented people from remunerative work

> in the bosom of their own families, where at one and the same time the necessities of the revenue could be reasonably met and all conditions observed which are requisite for the growth of young daughters and sons, without interfering with their education, or that privacy which belongs to the proper culture of growing girls [pp. 84–85].

A work such as Dr. Hurwitz' helps us to gain perspective and to appreciate the substantial progress made by the common man in the last fifty years.

PHILIP TAFT

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